FEDERAL AVIATION ADMINISTRATION
AIR TRAFFIC ORGANIZATION
WESTERN SERVICE AREA
TECHNICAL OPERATIONS
ENGINEERING SERVICES
NAVAIDS ENGINEERING

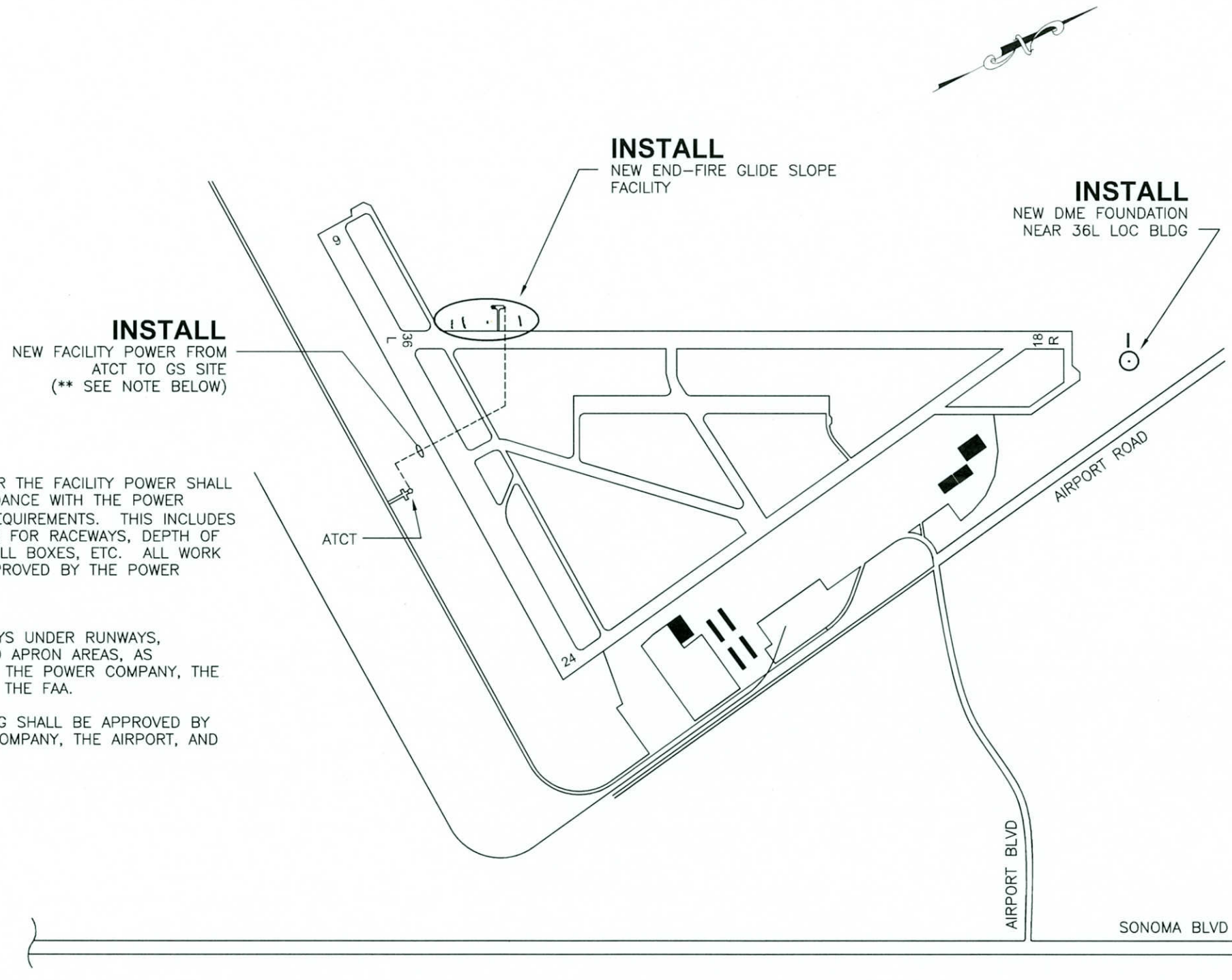
END-FIRE GLIDE SLOPE ANTENNA
RUNWAY 36L
NAPA COUNTY AIRPORT
NAPA, CALIFORNIA

LIST OF DRAWINGS

APC–B–GS36L–G001	VICINTIY PLAN
APC–B–GS36L–G002	ANTENNA LAYOUT
APC–B–GS36L–G003	ANTENNA INSTALLATION INSTRUCTIONS
APC–B–GS36L–G004	SITE PLAN
APC–B–GS36L–G005A	ANTENNA CABLING PLAN
APC–B–GS36L–G005B	PULL BOXES & TRENCH DETAILS
APC–B–GS36L–G006A	ANTENNA FOUNDATION DETAILS
APC–B–GS36L–G006B	HELICAL PIER FOUNDATION DETAILS
APC–B–GS36L–G007	EQUIPMENT BUILDING PLOT PLAN
APC–B–GS36L–G008	BUILDING INTERIOR LAYOUT (REFERENCE)
APC–B–GS36L–G009	BUILDING FOUNDATION
APC–B–GS36L–G010	BUILDING FOUNDATION, MISC DETAILS
APC–B–GS36L–G011	ROADS & GUARD POST
APC–B–DME–G012	DME FOUNDATION DETAIL

construction

5.5.11



** NOTE:
ALL WORK FOR THE FACILITY POWER SHALL BE IN ACCORDANCE WITH THE POWER COMPANY'S REQUIREMENTS. THIS INCLUDES REQUIREMENTS FOR RACEWAYS, DEPTH OF RACEWAYS, PULL BOXES, ETC. ALL WORK SHALL BE APPROVED BY THE POWER COMPANY.

BORE RACEWAYS UNDER RUNWAYS, TAXIWAYS, AND APRON AREAS, AS APPROVED BY THE POWER COMPANY, THE AIRPORT, AND THE FAA.

EXACT ROUTING SHALL BE APPROVED BY THE POWER COMPANY, THE AIRPORT, AND THE FAA.

construction

REVISED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO – TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END–FIRE GLIDE SLOPE ANTENNA
RUNWAY 36L
VICINITY PLAN

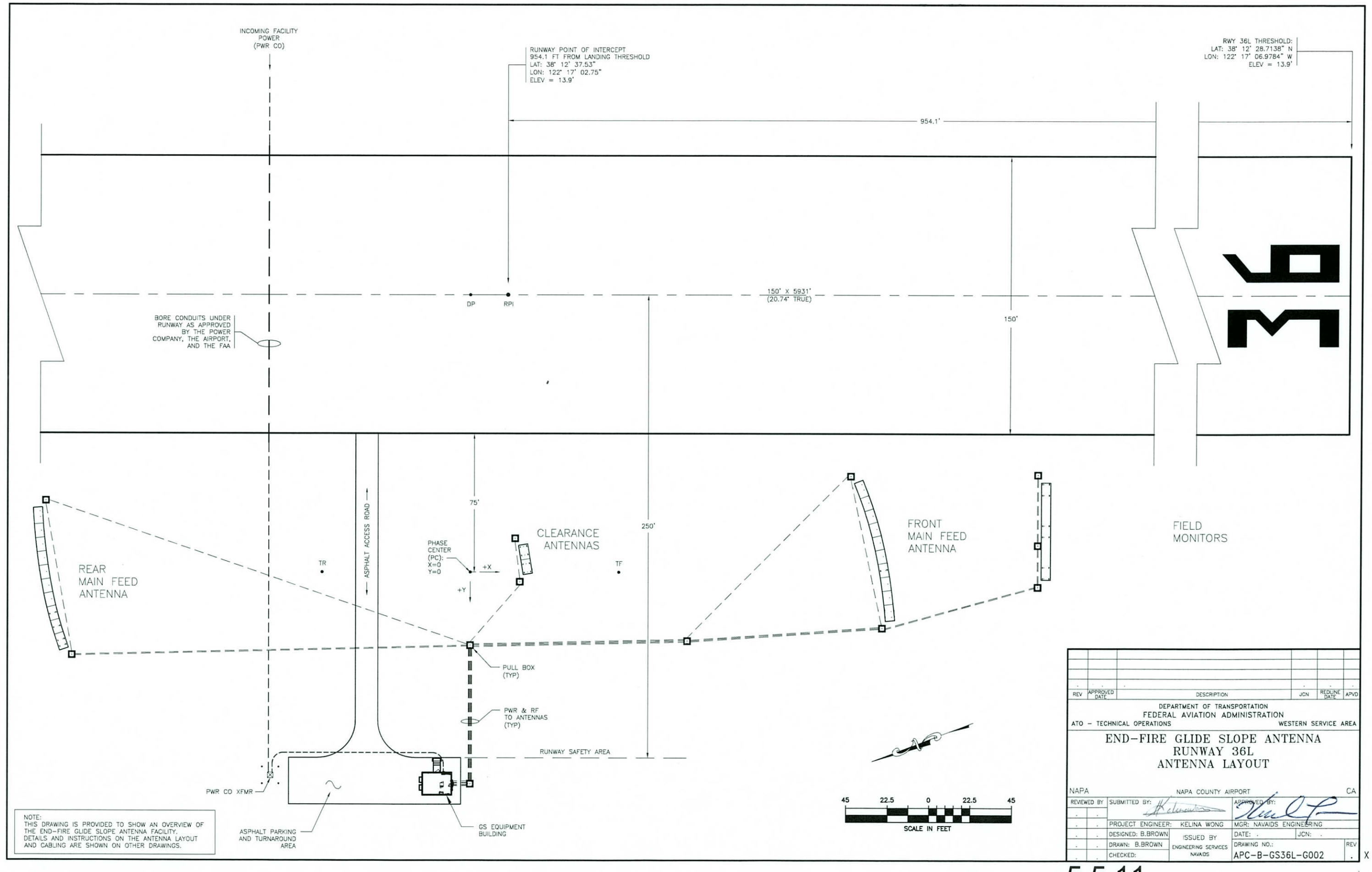
NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY	SUBMITTED BY:	APPROVED BY:
	PROJECT ENGINEER:	MGR: NAVAIDS ENGINEERING
	DESIGNED: B.BROWN	DATE: JCN:
	DRAWN: B.BROWN	DRAWING NO.: REV
	CHECKED:	APC–B–GS36L–G001 .

ISSUED BY ENGINEERING SERVICES NAVAIDS

X

5.5.11



NOTE:
THIS DRAWING IS PROVIDED TO SHOW AN OVERVIEW OF THE END-FIRE GLIDE SLOPE ANTENNA FACILITY. DETAILS AND INSTRUCTIONS ON THE ANTENNA LAYOUT AND CABLING ARE SHOWN ON OTHER DRAWINGS.

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO – TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L ANTENNA LAYOUT

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY		SUBMITTED BY:	APPROVED BY:	
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.	.	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING	
.	.	DESIGNED: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	DATE: . JCN: .
.	.	DRAWN: B.BROWN		DRAWING NO.: APC-B-GS36L-G002 REV .
.	.	CHECKED:		

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5.5.11

LAYOUT NOTES

1. SITING INFORMATION:

   LAYOUT OF THE SYSTEM IS ACCOMPLISHED WITH RESPECT TO THE RUNWAY POINT OF INTERCEPT (RPI). THE CONTRACTOR SHALL USE THE GIVEN THRESHOLD ELEVATION, RPI LOCATION/ELEVATION, THESE DRAWINGS, AND THE ANTENNA MANUFACTURER'S INSTRUCTIONS (SEE WWW.WATTSANTENNA.COM FOR MODEL 106 END-FIRE GLIDE SLOPE ANTENNA) TO COMPLETELY LAYOUT THE ANTENNA FACILITY. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED HORIZONTAL AND VERTICAL DATA. ALL CALCULATED TAPING DISTANCES SHALL BE SUBMITTED TO THE FAA PROJECT ENGINEER PRIOR TO CONSTRUCTION.

   ALL SURVEY WORK SHALL BE DONE BY A PROFESSIONAL LAND SURVEYOR.

   THE "CRITICAL AREA" (SEE DETAIL B) IS THE AREA WITHIN WHICH THE MOVEMENT OF VEHICLES OR AIRCRAFT MAY CAUSE A DISTURBANCE TO THE GLIDE SLOPE SIGNAL OBSERVED BY AN APPROACHING AIRCRAFT.

2. PHASE CENTER (ORIGIN):
   THE PHASE CENTER OF THE SYSTEM AT THE SHOULDER GRADE ELEVATION IS CONSIDERED TO BE THE "ORIGINATION POINT" OF THE GLIDE SLOPE SIGNAL. IT IS ALSO USED AS THE ORIGIN OF COORDINATES "X" AND "Y" FOR LAYING OUT THE LOCATIONS OF THE ANTENNA ELEMENTS. IT IS POSITIONED SO THAT NO PART OF THE ANTENNA WILL BE CLOSER TO THE RUNWAY EDGE THAN 25 FEET. A PERMANENT MARKER SHOULD BE INSTALLED 75 FEET FROM THE RUNWAY EDGE AND A DISTANCE "DP" BEHIND THE RPI:

   DP = DC x 4.77 / GA, FEET

   WHERE "DC" IS THE DIFFERENCE IN INCHES FROM THE RPI ELEVATION AND THE ELEVATION OF THE RUNWAY EDGE (ABEAM THE RPI), AND "GA" IS THE GLIDE ANGLE IN DEGREES.

3. TAPING POINTS:
   ESTABLISH A BASELINE ("X"-AXIS) THROUGH THE PHASE CENTER PARALLEL TO THE RUNWAY CENTERLINE. INSTALL PERMANENT MARKERS "TR" AND "TF" WITH BOLT INSERT OR PIN SUITABLE FOR HOOKING ON A STEEL MEASURING TAPE. THESE WILL BE USED FOR INITIAL LAYOUT OF THE MAIN ANTENNAS AND FOR FUTURE CHECKS OF THE ANTENNA CURVATURES:

TR	X = -80 FT.	Y = 0 FT.
TF	X = +80 FT.	Y = 0 FT.

4. MAIN ANTENNAS (MR AND MF):
   STAKE THE REAR AND FRONT #1 PEDESTAL LOCATIONS FOR ALL FREQUENCIES:

R1	X = -218.84 FT.	Y = 39.64 FT.
F1	X = +227.81 FT.	Y = 23.97 FT.

   VERIFY STAKE F1 AND R1 STAKE LOCATIONS AGAINST THE PEDESTAL #1 RADII FROM THE TAPING POINTS "TR" AND "TF" AS GIVEN IN THE FIRST LINE OF EACH TAPING TABLE. (DETAIL "A"). BEFORE CONTINUING WITH THE LAYOUT, IT IS NECESSARY TO CHOSE THE CORRECT COLUMN IN THE TAPING TABLES. THIS IS DONE BY COMPUTING THE COLUMN HEADING "FRFU" (FREQUENCY FUNCTION) AS FOLLOWS:

   FRFU = FREQ - 327.6 - (0.14 x FS)

   WHERE "FREQ" IS THE ASSIGNED STATION FREQUENCY IN MHz., AND "FS" IS THE TRANSVERSE SLOPE OF THE SHOULDER IN PERCENT. COMPUTE THE LATERAL SLOPE (FS) USING A POINT 25 FT AWAY FROM THE RUNWAY EDGE AND A POINT 100 FT FROM THE RUNWAY EDGE AT A DISTANCE APPROXIMATELY 230 FT FORWARD OF THE PHASE CENTER (FOR THE FRONT FRFU), AND APPROXIMATELY 220' IN BACK OF THE PHASE CENTER (FOR THE REAR FRFU).
   IF THIS VALUE OF "FRFU" FALLS BETWEEN THE TABULAR HEADINGS IT WILL BE NECESSARY TO CALCULATE A NEW COLUMN OF RADII BY INTERPOLATION. THE TOLERANCE TO BE APPLIED TO EACH RADIUS MEASUREMENT IS PLUS OR MINUS ONE TENTH FOOT.

5. FOUNDATIONS, REAR AND FRONT MAIN ANTENNAS:
   OBSERVE THAT THE PILINGS ARE IN EQUALLY SPACED PAIRS EXCEPT AT THE ENDS WHERE THEY ARE CLOSER TO GIVE EXTRA SUPPORT.

   CONSTRUCT A LAYOUT TEMPLATE ACCORDING TO DETAIL "C" AND PLACE THE CORNER (MARK "A") OF THE TEMPLATE AGAINST THE PEDESTAL #1 MARK. STRETCH A MEASURING TAPE FROM THE TAPING POINT. ROTATE THE TEMPLATE ABOUT THE PEDESTAL #1 UNTIL THE TAPED RADIUS TO MARK "D" LOCATION CORRESPONDS TO THE TABULAR VALUE FOR PEDESTAL #2 MARK THE LOCATION. ALSO MARK POINTS "B" AND "C" TO LOCATE THE CENTER OF THE PILINGS FOR PEDESTAL #1. RELOCATE THE TEMPLATE CORNER (MARK "A") AGAINST THE PEDESTAL #2 MARK. ROTATE THE TEMPLATE UNTIL THE TAPED RADIUS TO MARK "E" LOCATION CORRESPONDS TO THE TABULAR VALUE FOR PEDESTAL #3 AND MARK THE LOCATION. ALSO MARK POINTS "B" AND "C" TO LOCATE THE CENTER OF PILINGS FOR PEDESTAL #2. FOLLOW THIS PROCEDURE THROUGH THE ENTIRE LENGTH OF EACH ANTENNA, USING TEMPLATE MARK "E" FOR SPACING TO THE NEXT PEDESTAL LOCATION, EXCEPT WHEN REACHING END PEDESTAL #12, USE MARK "D" AGAIN FOR THE CLOSER SPACING.

6. FOUNDATIONS, SINGLE CLEARANCE ANTENNAS (SC):
   DRIVE PEDESTAL LOCATOR STAKE AT THE FOLLOWING LOCATION

SC1	X = +31.00 FT.	Y = 0.0 FT.
SC2	X = +30.28 FT.	Y = -4.53 FT.
SC3	X = +29.52 FT.	Y = -9.30 FT.
SC4	X = +28.80 FT.	Y = -13.83 FT.

   LAYOUT AND STAKE ANCHOR BOLTS IN RECTANGLES, SEE SINGLE CLEARANCE ANTENNA FOUNDATION DETAIL. ALIGN THE FOUNDATIONS PERPENDICULAR TO AN IMAGINARY LINE FROM LOCATOR STAKE SC1 TO LOCATOR STAKE SC4.

7. FOUNDATIONS, FIELD MONITOR ANTENNAS (M):
   DRIVE STAKES AT CORNER PILING LOCATIONS:

   M1 X = +310.0 FT. Y = +3.0 FT.

   LAYOUT AND STAKE REMAINING PEDESTAL ANCHOR BOLTS PER FOUNDATION PLAN ALIGNING FOUNDATION PERPENDICULAR TO THE RUNWAY.

8. TOLERANCES:
   INSTALLATION TOLERANCE ON ALL DIMENSIONS IS PLUS OR MINUS ONE INCH.

NAPA 36L GS DATA

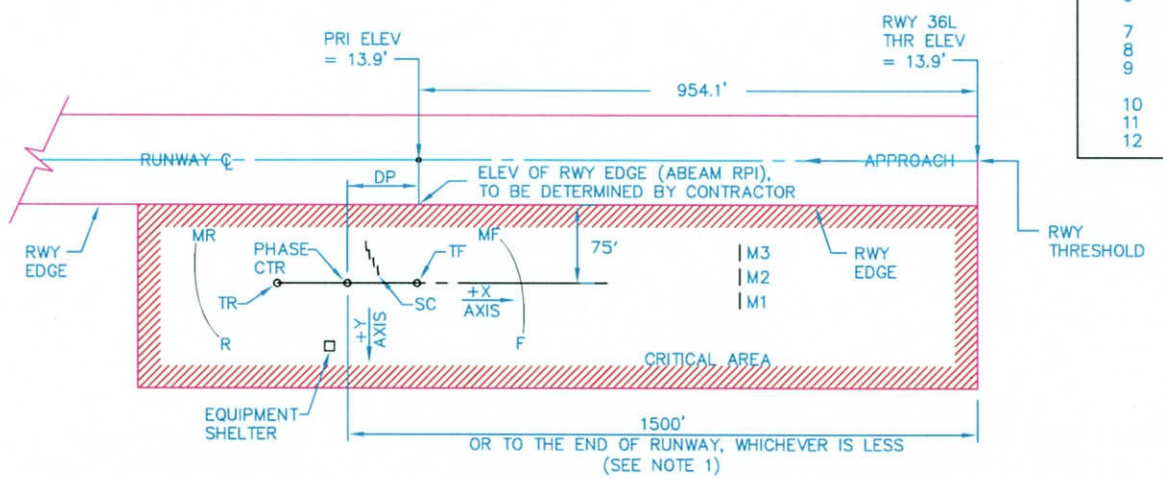
GLIDE ANGLE (GA): 3.00°
THRESHOLD CROSSING HT (TCH): 50 FT
ANTENNA FREQUENCY: 332.3 MHz

REAR MAIN ANTENNA PEDESTAL TAPING RADII

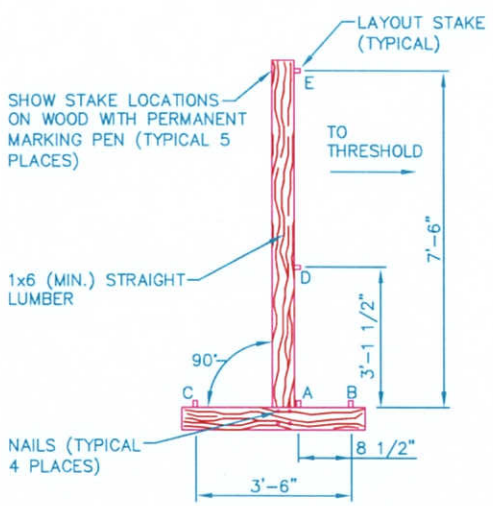
FRFU	1.0	2.0	3.0	4.0	5.0	6.0	7.0
PEDESTAL	FEET	FEET	FEET	FEET	FEET	FEET	FEET
1	144.38	144.38	144.38	144.38	144.38	144.38	144.38
2	144.67	144.69	144.65	144.59	144.54	144.55	144.59
3	145.38	145.38	145.32	145.24	145.17	145.14	145.13
4	146.19	146.16	146.09	146.00	145.91	145.85	145.79
5	147.12	147.04	146.94	146.83	146.74	146.66	146.59
6	148.20	148.07	147.91	147.76	147.65	147.56	147.48
7	149.44	149.28	149.09	148.88	148.72	148.59	148.47
8	150.83	150.66	150.43	150.20	150.00	149.83	149.66
9	152.38	152.18	151.94	151.70	151.48	151.28	151.09
10	154.09	153.87	153.62	153.35	153.11	152.91	152.70
11	155.98	155.74	155.45	155.16	154.90	154.66	154.44
12	156.83	156.58	156.28	155.98	155.70	155.46	155.22

FRONT MAIN ANTENNA PEDESTAL TAPING RADII

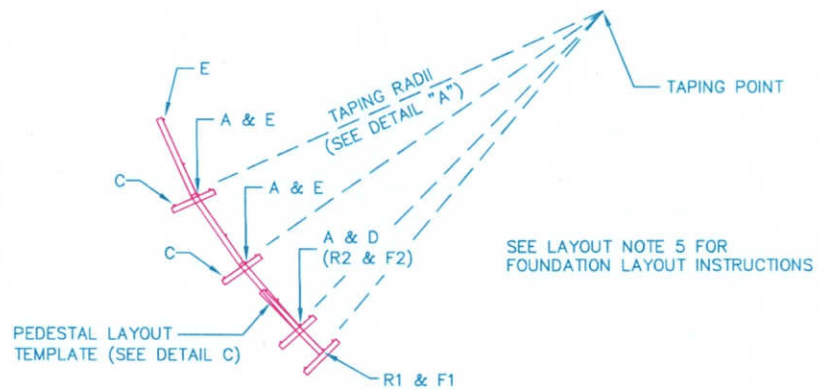
FRFU	1.0	2.0	3.0	4.0	5.0	6.0	7.0
PEDESTAL	FEET	FEET	FEET	FEET	FEET	FEET	FEET
1	149.74	149.74	149.74	149.74	149.74	149.74	149.74
2	148.93	148.91	148.94	149.01	149.05	149.04	149.01
3	147.18	147.18	147.24	147.32	147.39	147.41	147.43
4	145.62	145.66	145.73	145.82	145.90	145.96	146.02
5	144.27	144.34	144.45	144.56	144.64	144.72	144.79
6	143.06	143.19	143.34	143.50	143.61	143.69	143.78
7	142.00	142.16	142.36	142.56	142.73	142.85	142.98
8	141.10	141.28	141.50	141.74	141.94	142.11	142.28
9	140.35	140.55	140.79	141.04	141.26	141.46	141.65
10	139.74	139.96	140.22	140.49	140.73	140.94	141.16
11	139.25	139.50	139.79	140.08	140.35	140.59	140.82
12	139.06	139.33	139.63	139.94	140.22	140.47	140.72



DETAIL B
CRITICAL AREA



DETAIL C
PEDESTAL LAYOUT TEMPLATE



DETAIL D
TYPICAL PEDESTAL LAYOUT DIAGRAM

construction

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

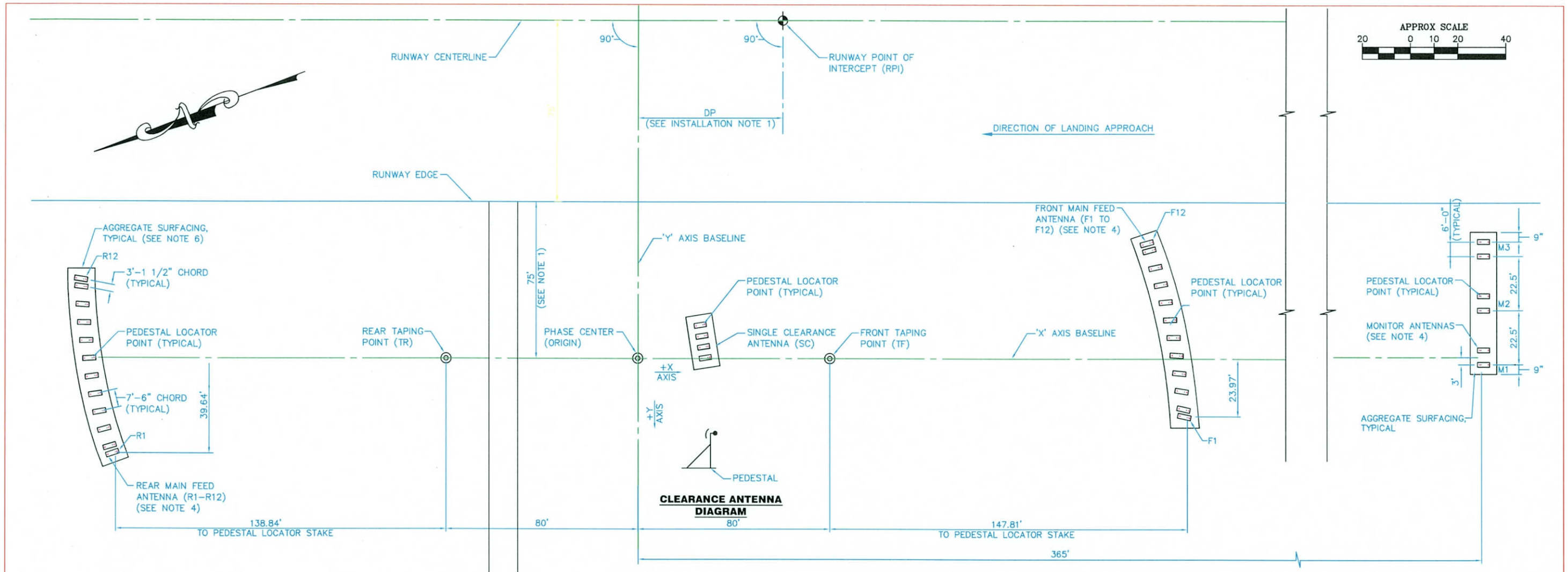
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA

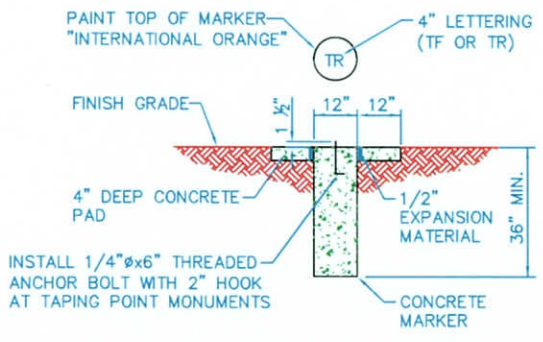
END-FIRE GLIDE SLOPE ANTENNA
RUNWAY 36L
ANTENNA INSTALLATION INSTRUCTIONS

NAPA NAPA COUNTY AIRPORT CA

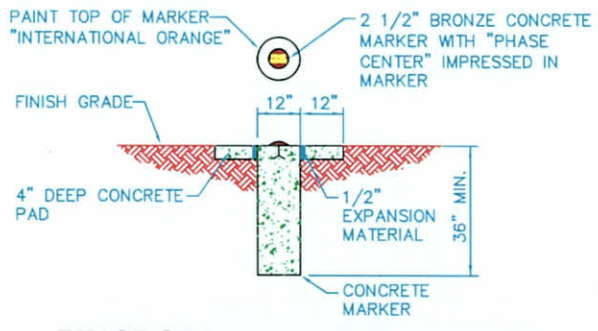
REVIEWED BY		SUBMITTED BY:	APPROVED BY:	
.	.			
.	.	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING	
.	.	DESIGNED: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	DATE: . JCN: .
.	.	DRAWN: B.BROWN		DRAWING NO.: APC-B-GS36L-G003 REV .
.	.	CHECKED:		

** ADAPTED FROM OHIO UNIV/ARMSTRONG DRAWING D-XXXX-3





TAPING POINT MARKER - DETAIL A
(TF AND TR)
NOT TO SCALE



PHASE CENTER MARKER - DETAIL B
(ORIGIN)
NOT TO SCALE

NOTES

1. SEE ANTENNA INSTALLATION INSTRUCTION SHEET FOR LAYOUT INSTRUCTIONS.
2. CONSTRUCT PERMANENT CONCRETE MARKERS AT THE PHASE CENTER LOCATION (ORIGIN) PER DETAIL THIS SHEET. INSTALL 2 1/2" DIA., BRONZE CONCRETE MARKER WITH "PHASE CENTER" IMPRESSED IN MARKER.
3. CONSTRUCT PERMANENT CONCRETE MARKERS AT EACH TAPING POINT LOCATION (TF AND TR) PER DETAIL THIS SHEET, AND IMPRESS THE LETTERS "TF" AND "TR" RESPECTIVELY ON THE TOP SURFACE.
4. CONSTRUCT THE FOUNDATIONS FOR THE FRONT AND REAR MAIN ANTENNAS (R1-R12, F1-F12), CLEARANCE ANTENNA (SC), AND THE MONITOR PICKUPS (M1, M2 AND M3).

construction

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
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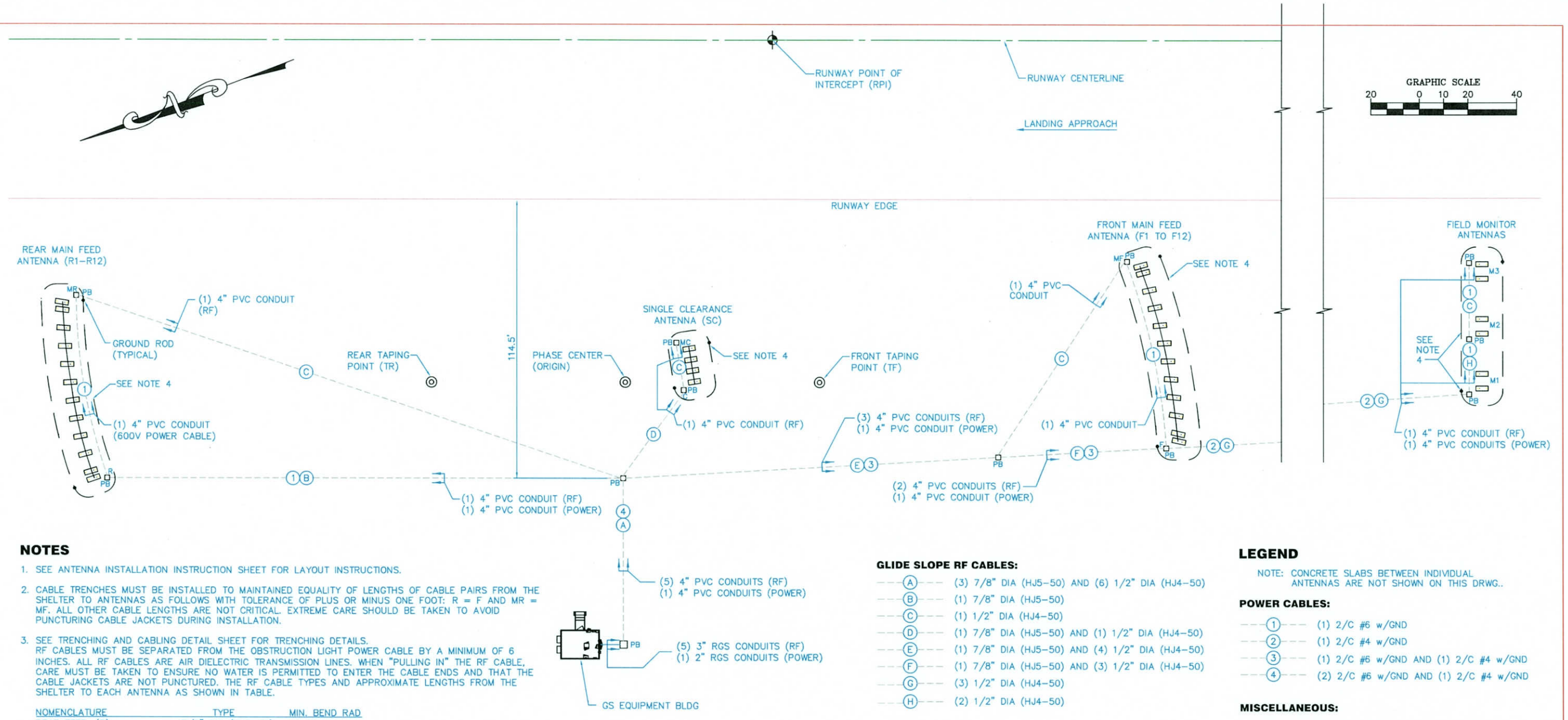
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L SITE PLAN

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY		SUBMITTED BY:	APPROVED BY:	
.	.			
.	.	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING	
.	.	DESIGNED: B.BROWN	DATE: .	JCN: .
.	.	DRAWN: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	DRAWING NO.: APC-B-GS36L-G004 REV .
.	.	CHECKED:		

** ADAPTED FROM OHIO UNIV/ARMSTRONG DRAWING D-XXXX-4



NOTES

1. SEE ANTENNA INSTALLATION INSTRUCTION SHEET FOR LAYOUT INSTRUCTIONS.
2. CABLE TRENCHES MUST BE INSTALLED TO MAINTAINED EQUALITY OF LENGTHS OF CABLE PAIRS FROM THE SHELTER TO ANTENNAS AS FOLLOWS WITH TOLERANCE OF PLUS OR MINUS ONE FOOT: R = F AND MR = MF. ALL OTHER CABLE LENGTHS ARE NOT CRITICAL. EXTREME CARE SHOULD BE TAKEN TO AVOID PUNCTURING CABLE JACKETS DURING INSTALLATION.
3. SEE TRENCHING AND CABLING DETAIL SHEET FOR TRENCHING DETAILS.
   RF CABLES MUST BE SEPARATED FROM THE OBSTRUCTION LIGHT POWER CABLE BY A MINIMUM OF 6 INCHES. ALL RF CABLES ARE AIR DIELECTRIC TRANSMISSION LINES. WHEN "PULLING IN" THE RF CABLE, CARE MUST BE TAKEN TO ENSURE NO WATER IS PERMITTED TO ENTER THE CABLE ENDS AND THAT THE CABLE JACKETS ARE NOT PUNCTURED. THE RF CABLE TYPES AND APPROXIMATE LENGTHS FROM THE SHELTER TO EACH ANTENNA AS SHOWN IN TABLE.

NOMENCLATURE	TYPE	MIN. BEND RAD
REAR FEED, (R)	7/8" DIA (HJ5–50)	10 IN.
FRONT FEED, (F)	7/8" DIA (HJ5–50)	10 IN.
CLEARANCE FEED, (C)	7/8" DIA (HJ5–50)	10 IN.
FLD MON, (M1)	1/2" DIA (HJ4–50)	5 IN.
FLD MON, (M2)	1/2" DIA (HJ4–50)	5 IN.
FLD MON, (M3)	1/2" DIA (HJ4–50)	5 IN
INT MON, (MR)	1/2" DIA (HJ4–50)	5 IN.
INT MON, (MF)	1/2" DIA (HJ4–50)	5 IN.
INT MON CLEARANCE (MC)	1/2" DIA (HJ4–50)	5 IN.

   TAKE CARE NOT TO KINK RF CABLES AND TO OBSERVE THE MINIMUM BEND RADIUS.
   7 FEET (MINIMUM) OF SLACK SHALL BE LEFT AT EACH CABLE TERMINATION POINT TO ALLOW FOR ANTENNA POSITION ADJUSTMENTS.

   FRONT FEED, REAR FEED, AND MONITOR CABLES MUST BE ALL FROM SAME CABLE REEL.
4. INSTALL A CONTINUOUS #4/0 AWG, STRANDED, BSDC COUNTERPOISE A MINIMUM OF 2' FROM THE FOUNDATIONS AND AT A DEPTH OF 30" BELOW GRADE. DRIVE 3/4" DIA. X 10' LONG COPPER CLAD GROUND RODS TO A TIP DEPTHS OF 11'–0" BELOW GRADE. GROUND RODS SHALL BE SPACED A MINIMUM OF 20' APART. EXOTHERMICALLY WELD #4/0 TO GROUND RODS. CONNECT COUNTERPOISE TO TRENCH GUARD WIRE.
5. EXACT LOCATION OF PULLBOXES AND GRMC/PVC SWEEPS SHALL BE APPROVED BY THE FAA PROJECT ENGINEER.
6. ALL CONDUIT SWEEPS SHALL BE LONG BENDS (AT LEAST 36" MIN). ALL PVC SHALL BE SCH 40 AND CONCRETE ENCASED. ALL GRMC SHALL BE COATED PER FAA SPECIFICATION 1217f.

** ADAPTED FROM OHIO UNIV/ARMSTRONG DRAWING D–XXXX–5

GLIDE SLOPE RF CABLES:

- (A) (3) 7/8" DIA (HJ5–50) AND (6) 1/2" DIA (HJ4–50)
- (B) (1) 7/8" DIA (HJ5–50)
- (C) (1) 1/2" DIA (HJ4–50)
- (D) (1) 7/8" DIA (HJ5–50) AND (1) 1/2" DIA (HJ4–50)
- (E) (1) 7/8" DIA (HJ5–50) AND (4) 1/2" DIA (HJ4–50)
- (F) (1) 7/8" DIA (HJ5–50) AND (3) 1/2" DIA (HJ4–50)
- (G) (3) 1/2" DIA (HJ4–50)
- (H) (2) 1/2" DIA (HJ4–50)

LEGEND

NOTE: CONCRETE SLABS BETWEEN INDIVIDUAL ANTENNAS ARE NOT SHOWN ON THIS DRWG..

POWER CABLES:

- (1) (1) 2/C #6 w/GND
- (2) (1) 2/C #4 w/GND
- (3) (1) 2/C #6 w/GND AND (1) 2/C #4 w/GND
- (4) (2) 2/C #6 w/GND AND (1) 2/C #4 w/GND

MISCELLANEOUS:

PB □ PULL BOX (HANDHOLE OR MANHOLE)

construction

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO – TECHNICAL OPERATIONS WESTERN SERVICE AREA

END–FIRE GLIDE SLOPE ANTENNA RUNWAY 36L ANTENNA CABLING PLAN

NAPA NAPA COUNTY AIRPORT CA

REVIEWED BY		SUBMITTED BY:		APPROVED BY:	
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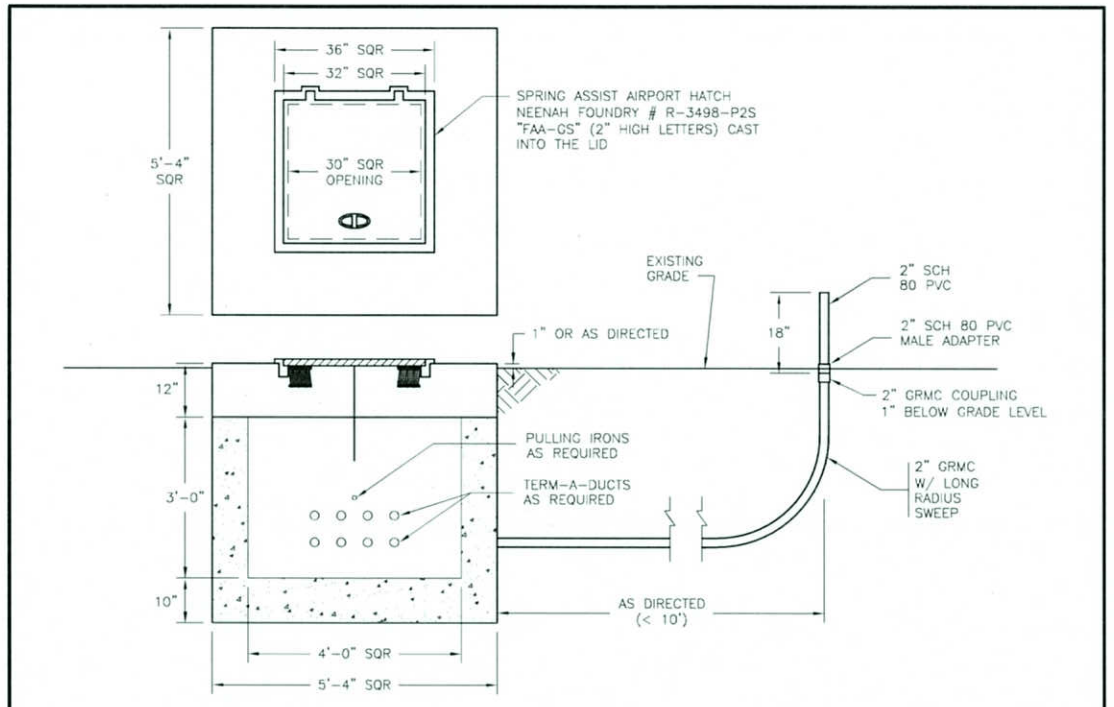
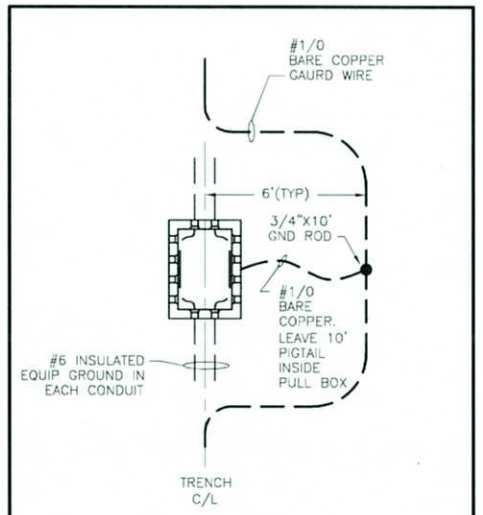
.	.	PROJECT ENGINEER: KELINA WONG	ISSUED BY ENGINEERING SERVICES NAVAIDS	MGR: NAVAIDS ENGINEERING	
.	.	DESIGNED: B.BROWN		DATE: .	JCN: .
.	.	DRAWN: B.BROWN		DRAWING NO.: APC–B–GS36L–G005A	REV .
.	.	CHECKED:			



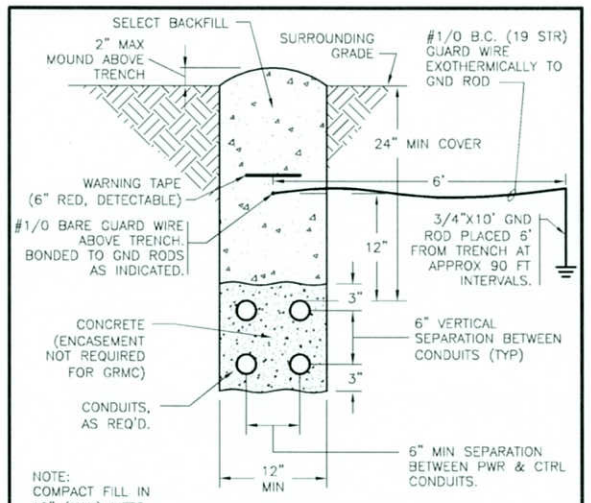
AIRCRAFT RATED ELECTRICAL PULL BOX
NOT TO SCALE

NOTE:

MANHOLE AND VAULT SHALL BE DESIGNED FOR 100,000 LB WHEEL LOADS WITH 250 PSI TIRE PRESSURE, PER AC 150/5320-6D, APP 3.



TYPICAL GROUND ROD INSTALLATION AT PULL BOX
NOT TO SCALE



TRENCH DETAIL
NOT TO SCALE

THIS TRENCH DETAIL DOES NOT APPLY TO THE POWER COMPANY'S TRENCH. TRENCH FOR THE POWER COMPANY SHALL BE PER THE POWER COMPANY'S REQUIREMENTS, AND APPROVED BY THEM.

construction

REV	APVD	DESCRIPTION	JCN	REQUIRE DATE	APVD

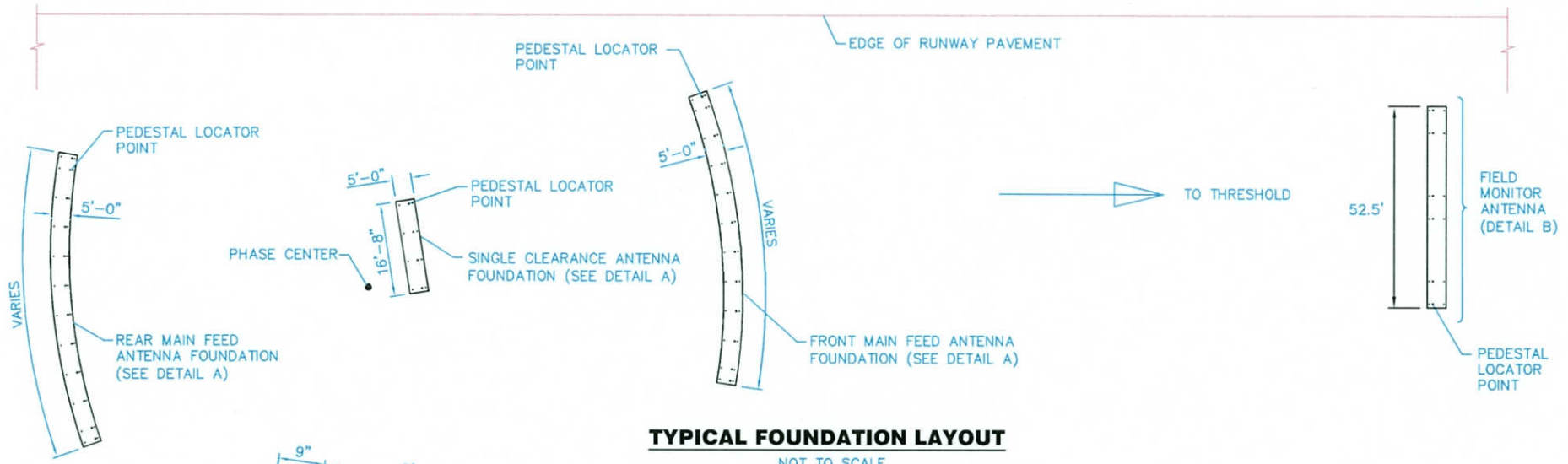
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA
RUNWAY 36L
PULL BOXES & TRENCH DTLS

NAPA — NAPA COUNTY AIRPORT — CA

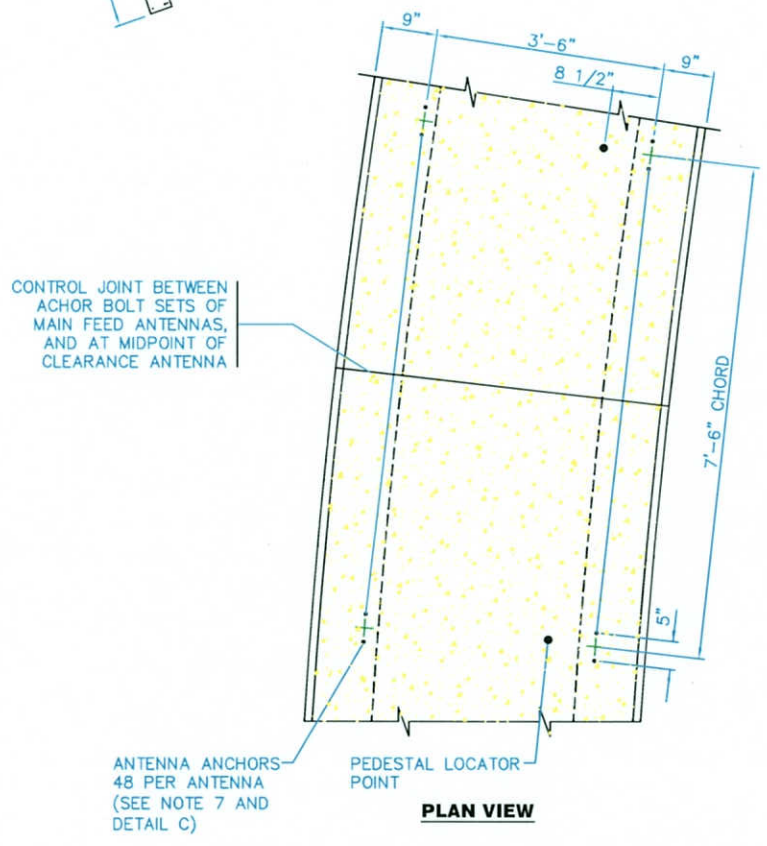
REVIEWED BY	SUBMITTED BY:	APPROVED BY:	
PROJECT ENGINEER: KELINA WONG		MGR: NAVAIDS ENGINEERING	
DESIGNED: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	DATE: .	JCN: .
DRAWN: B.BROWN		DRAWING NO.: APC-B-GS36L-G005B	REV . X
CHECKED:			

5.5.11

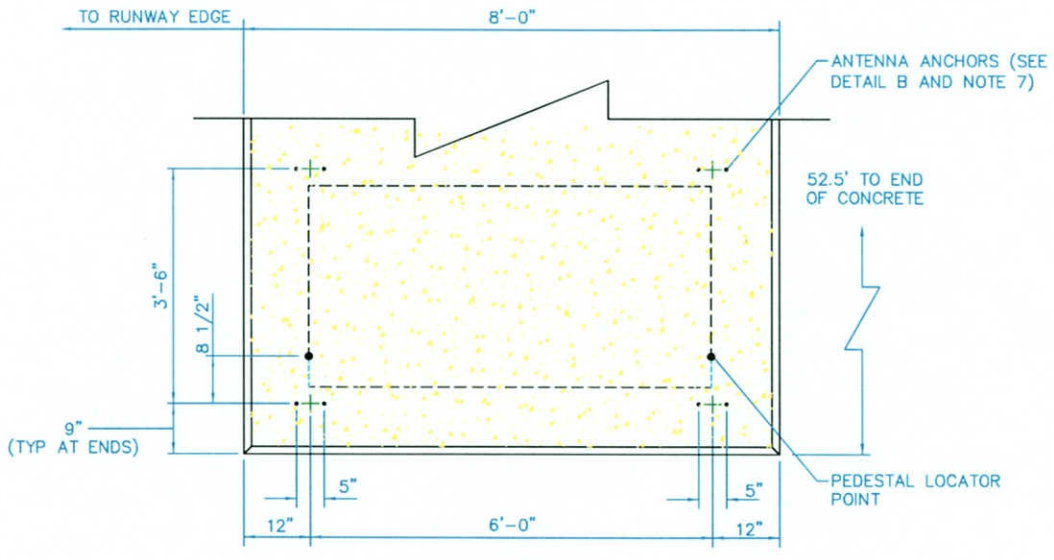


TYPICAL FOUNDATION LAYOUT

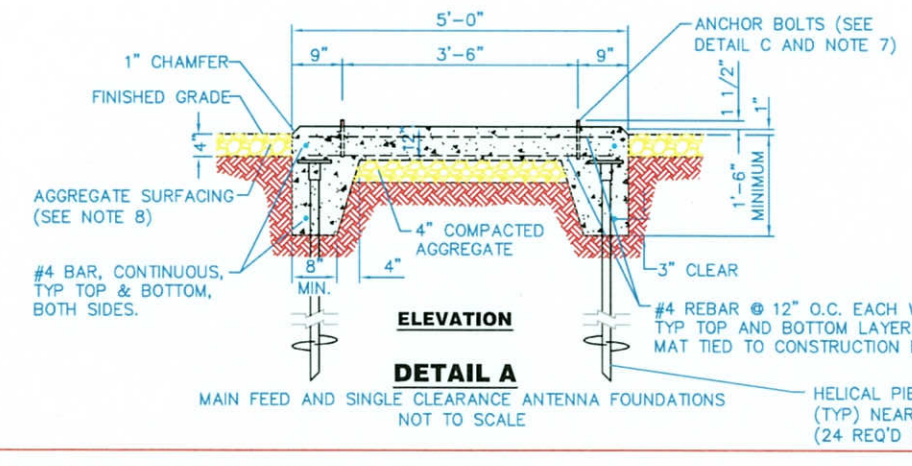
NOT TO SCALE



PLAN VIEW



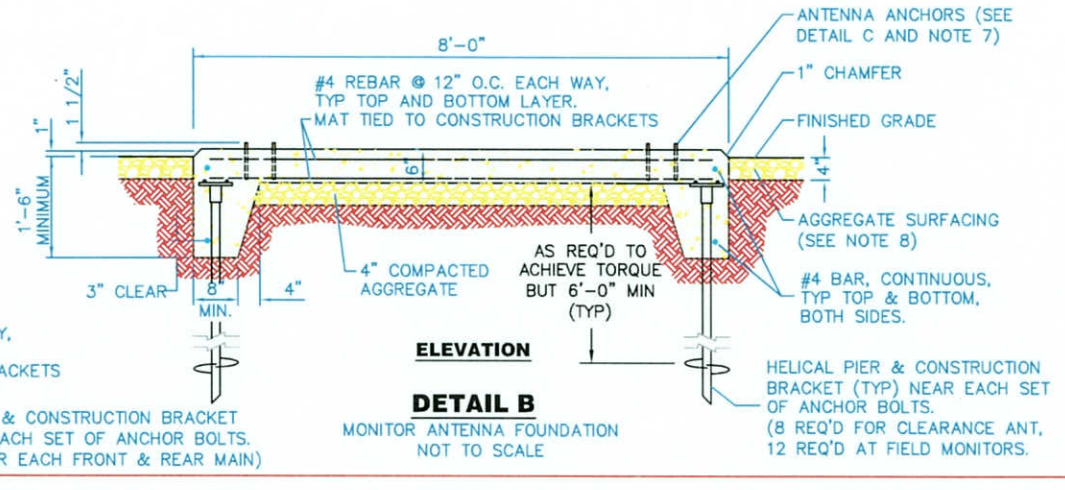
PLAN VIEW



ELEVATION

DETAIL A

MAIN FEED AND SINGLE CLEARANCE ANTENNA FOUNDATIONS
NOT TO SCALE



ELEVATION

DETAIL B

MONITOR ANTENNA FOUNDATION
NOT TO SCALE

NOTES

1. TAPING OF FOUNDATION AND ANTENNA DISTANCES SHALL BE IN ACCORDANCE WITH THE GLIDE SLOPE ANTENNA INSTALLATION LAYOUT AND INSTRUCTION PLAN SHEETS FOR THE MODEL SYSTEM BEING INSTALLED.
2. FOUNDATION DIMENSIONS ARE REFERENCED FROM THE PEDESTAL LOCATOR POINT AND NOT THE ANTENNAS.
3. CONCRETE SHALL DEVELOP 3000 PSI IN 28 DAYS AND HAVE A MAXIMUM SLUMP OF 3". AGGREGATE SIZE SHALL NOT EXCEED 3/4".
4. NOT USED.
5. FOUNDATION REINFORCING SHALL BE BONDED TO THE EES USING A #2 BSDC.
6. THE SURFACE OF THE FOUNDATIONS SHALL BE 1" TO 1 1/2" ABOVE THE GROUND, AND WHERE POSSIBLE, SHOULD FOLLOW THE EXISTING SHOULDER CURVATURE OR GRADE. HOWEVER, IN THE CASE OF THE MAIN ANTENNAS, IT IS NECESSARY TO AVOID BENDING AN ANTENNA TOO SHARPLY WHILE FOLLOWING THE SHOULDER GRADE. A STRAIGHT LINE OF SITE FROM THE TOPS OF ANY TWO ADJACENT PAIRS OF FOUNDATIONS, SPACED 7.5, MUST NOT PASS ABOVE OR BELOW THE TOPS OF THE NEXT PAIR OF FOUNDATIONS BY MORE THAN 5".
7. ANCHORS (140 TOTAL, 136 REQUIRED PLUS 4 SPARES) SHALL BE HOT DIP GALVANIZED STEEL PER ASTM A153. INSTALL WITH 1 1/2" INCHES OF THREAD PROJECTED ABOVE FINISH SURFACE OF CONCRETE FOUNDATION (SEE DETAIL C). STUD TYPE OR CHEMICAL ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CAD PLATED THREADED ROD IS NOT ACCEPTABLE.
8. INSTALL 4" DEEP AGGREGATE SURFACING (1" MAXIMUM AGGREGATE SIZE) A MINIMUM OF 3' AROUND PERIMETER AND BETWEEN ALL FOUNDATIONS. ENGINEER MAY SPECIFY OPTIONAL 4" DEEP CONCRETE SIDEWALK AROUND AND BETWEEN FOUNDATIONS IN LIEU OF AGGREGATE SURFACING.

construction

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
.	.	.	.	.	.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

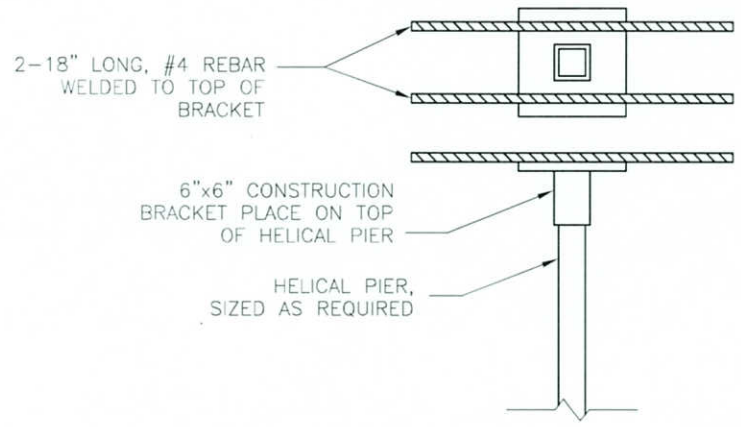
END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L ANTENNA FOUNDATION DETAILS

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY		SUBMITTED BY:		APPROVED BY:	
.	.				
.	.	PROJECT ENGINEER: BOB BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	MGR: NAVAIDS ENGINEERING	
.	.	DESIGNED: B.BROWN		DATE: .	JCN: .
.	.	DRAWN: B.BROWN		DRAWING NO.: APC-B-GS36L-G006A	REV . X
.	.	CHECKED:			

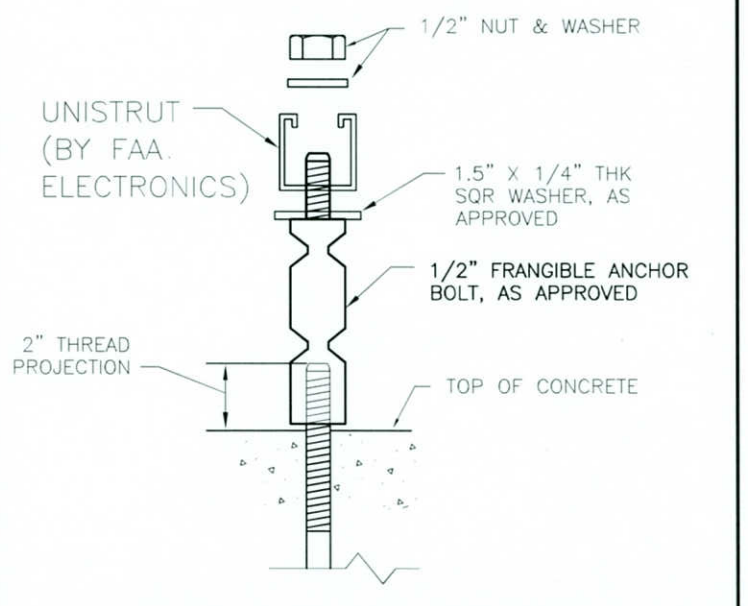
** ADAPTED FROM OHIO UNIV/ARMSTRONG DRAWING D-XXXX-11

5.5.11



CONSTRUCTION BRACKET DETAIL

NOT TO SCALE



FRANGIBLE ANCHOR BOLT

NOT TO SCALE

HELICAL PIER NOTES:

1. HELICAL PIER LEAD SECTIONS, EXTENSIONS, AND TERMINATION UNITS ARE MANUFACTURED BY A.B. CHANCE COMPANY, CENTRALIA MO. (573-682-8414).
2. HELICAL PIERS SUPPLIED AND INSTALLED BY A CONTRACTOR TRAINED AND CERTIFIED AS AN INSTALLER BY THE PIER MANUFACTURER.
3. HELICAL PIERS ARE SIZED AND INSTALLED TO RESIST AN UNFACTORED DESIGN LOAD OF 25,000 POUNDS (TENSION & COMPRESSION).
4. CENTRAL SHAFT OF PIERS AND EXTENSIONS ARE 1 1/2" HOT ROLLED ROUND-CORNERED-SQUARE (RCS) SOLID STEEL BARS MEETING DIMENSIONAL AND WORKMANSHIP REQUIREMENTS OF ASTM A29. THE BAR SHALL BE MODIFIED MEDIUM CARBON STEEL GRADE (SIMILAR TO AISI 1044) WITH IMPROVED STRENGTH DUE TO FINE GRAIN SIZE.
   TORQUE STRENGTH RATING = 5,500 FT-LB
   MINIMUM YIELD STRENGTH = 70 KSI
5. HELICAL PIERS ARE INSTALLED IN A SMOOTH, CONTINUOUS MANNER, AND IN FULL COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES.
6. HELICAL PIERS ARE VERTICAL WITH A MAXIMUM DEFLECTION OF 2°.
7. A RECORD OF PIER INSTALLATION SHALL BE SUBMITTED TO THE FAA PROJECT ENGINEER. SHOW THE NAME OF AUTHORIZED DEALER AND INSTALLER. ASSIGN EACH PIER A NUMBER; FOR EACH PIER, NOTE THE DATE OF INSTALLATION, DESCRIPTION OF LEAD SECTION INCLUDING NUMBER AND DIAMETER OF HELICES AND EXTENSIONS USED, OVERALL DEPTH OF INSTALLATION (BELOW GRADE), AND THE ENDING INSTALLATION TORQUE.
8. CONTRACTOR IS ENCOURAGED TO INSTALL ONE OR MORE TEST PIERS TO CONFIRM SITE CONDITIONS.

FOR BIDDING PURPOSES, ASSUME 14' HELICAL PIER DEPTH. THEN PROVIDE PRICE FOR ADDITIONAL FOOT.

construction

REVISED	REQUIRED DATE	DESCRIPTION	JCN	REQUIRE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

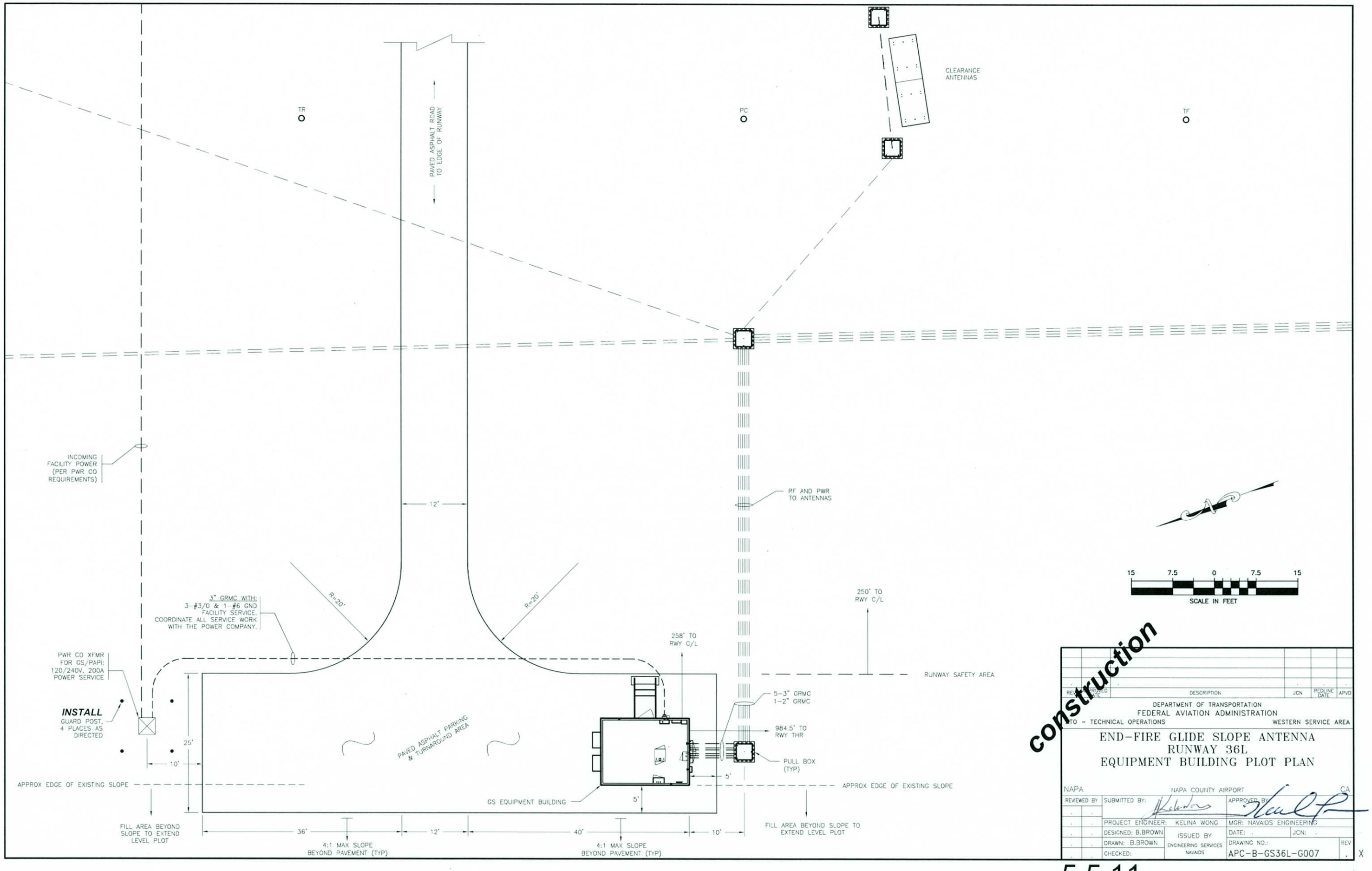
END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L HELICAL PIER FOUNDATION DETAILS

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY	SUBMITTED BY:	APPROVED BY:
	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING
	DESIGNED: B.BROWN	DATE: JCN:
	DRAWN: B.BROWN	DRAWING NO.: APC-B-GS36L-G006B REV . X
	CHECKED:	

ISSUED BY ENGINEERING SERVICES NAVAIDS

5.5.11



construction

REV	REVISED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

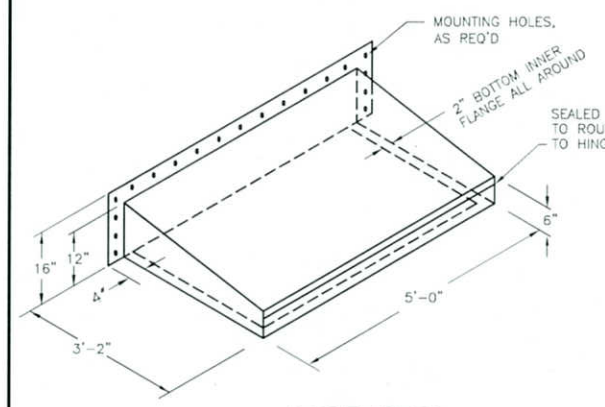
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L EQUIPMENT BUILDING PLOT PLAN

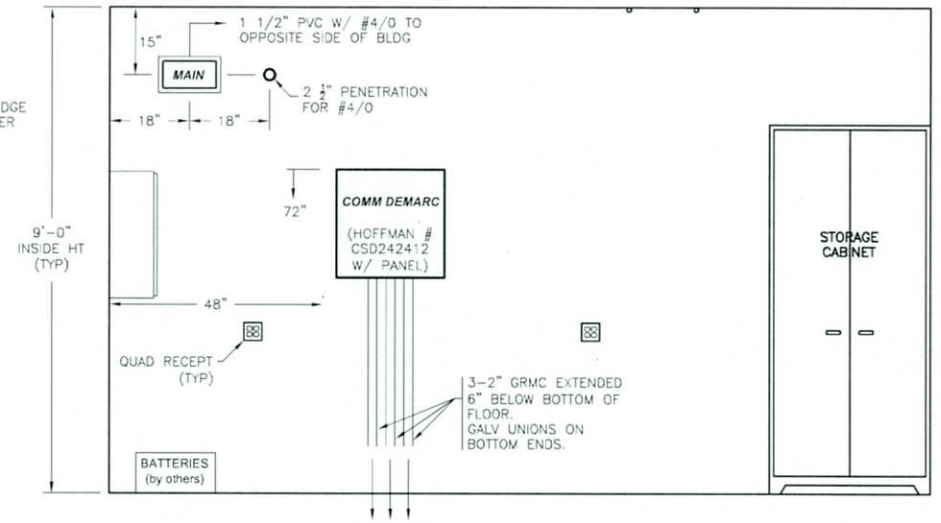
NAPA — NAPA COUNTY AIRPORT — CA

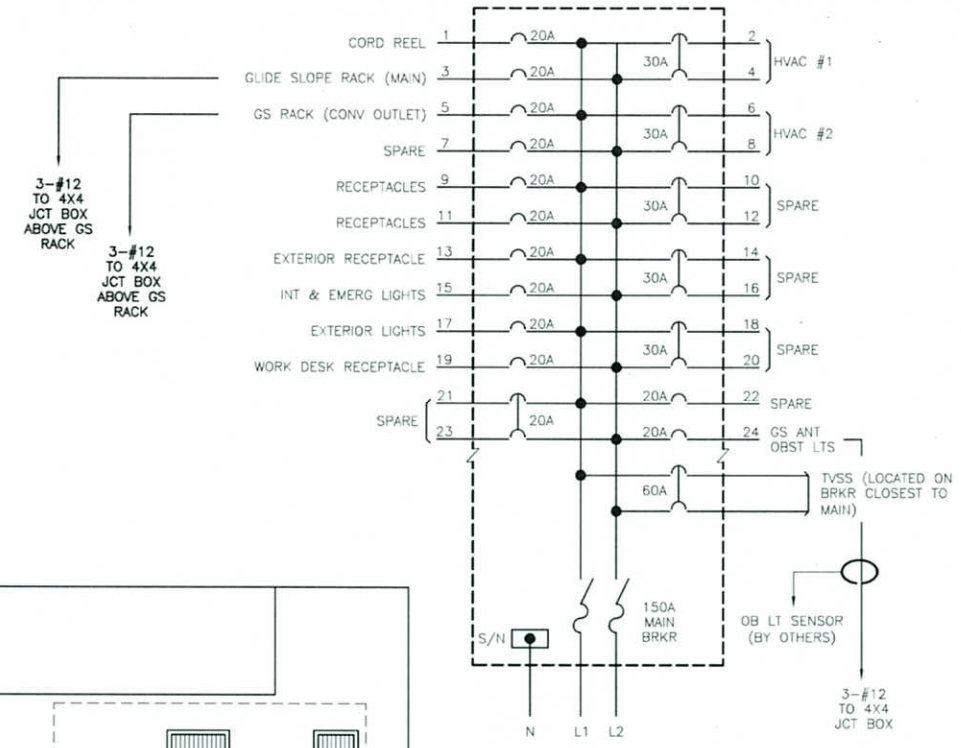
REVIEWED BY		SUBMITTED BY:	APPROVED BY:
.	.		
.	.	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING
.	.	DESIGNED: B.BROWN	DATE: . JCN: .
.	.	DRAWN: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS
.	.	CHECKED:	DRAWING NO.: APC-B-GS36L-G007 REV . X

5.5.11

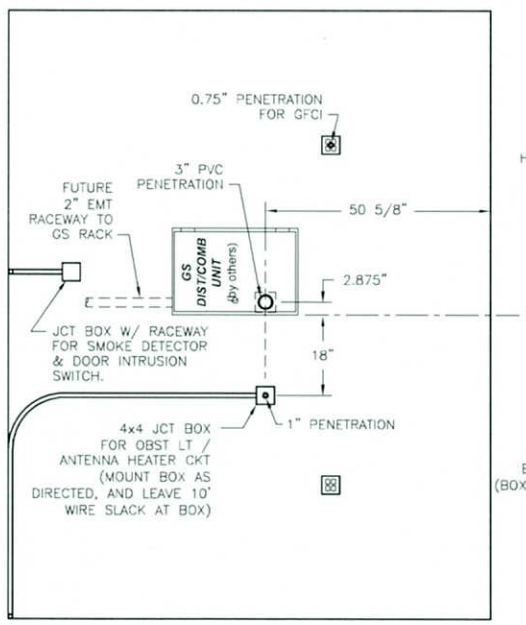


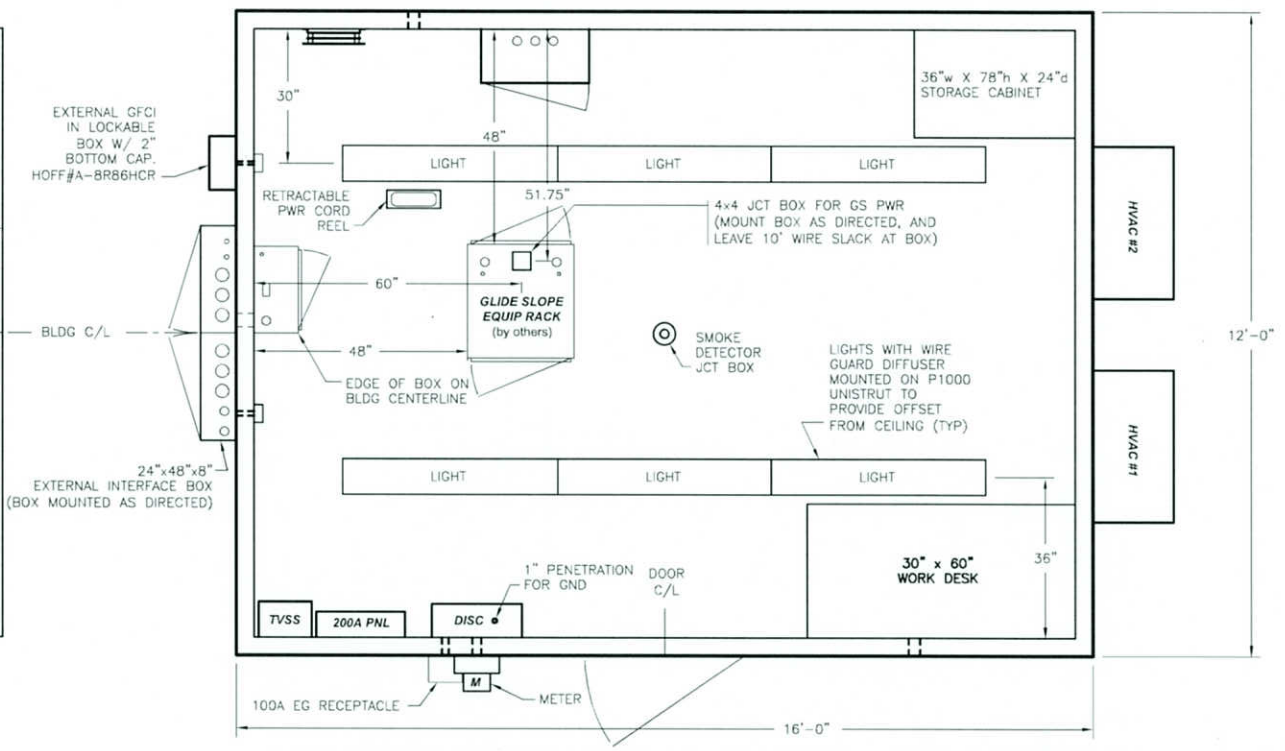
DOOR HOOD
NOT TO SCALE

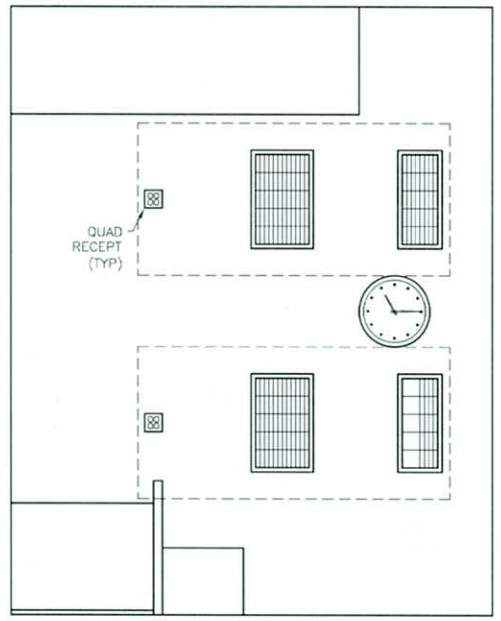




DISTRIBUTION PANEL
1Ø, 120/240V, 150A MAIN, 42 SPACES REQ'D







EXTERIOR WALL PENETRATIONS REQUIRED:

2" HUB FROM MAIN DISC TO METER LOCATION (THREADED COUPLING REQUIRED).

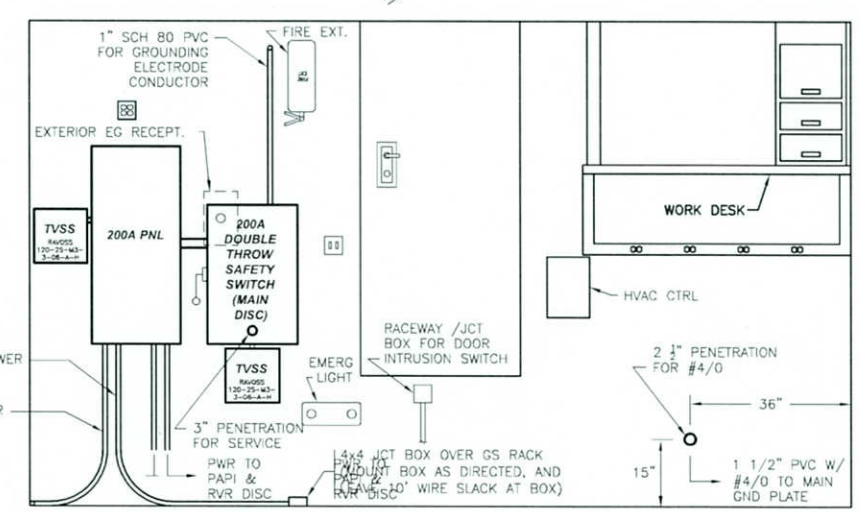
1.5" HUB FROM EXTERIOR EG RECEPTACLE. (THREADED COUPLING REQUIRED).

2-2.5" HUBS W/ INTERNAL PVC SLEEVE FOR MULTIPOINT GROUND (THREADED COUPLING REQUIRED).

0.75" SLEEVE FOR EXTERNAL GFCI OUTLET (FROM 4X4 BOX).

3" PVC SLEEVE FOR FUTURE DIST/COMB UNIT.

1" SLEEVE FOR FUTURE POWER TO GS ANTENNA (FROM 4X4 BOX).



SAMPLE DOOR SIGN
NOT TO SCALE

EXTERIOR COLOR: ORANGE & WHITE CHECKERBOARD

NOTES:

1. ALL WORK SHALL BE IN COMPLIANCE WITH FAA SPECIFICATION 1217f, FAA STANDARD 019e, AND THE NATIONAL ELECTRIC CODE.
2. PROVIDE ADDITIONAL CONDUITS, RACEWAYS, RECEPTACLES, ENCLOSURES, CONTROLS FOR HVAC, AND MISC BLDG UTILITIES REQUIRED FOR THE FUNCTIONALITY OF THE BUILDING.
3. HVAC UNITS ARE SELF CONTAINED, HEAT/AIR UNITS WITH 2 TON AIR COOLING, 5 KW HEAT, AND A SCROLL COMPRESSOR.

reference

REV	ARP	DESCRIPTION	JCN	REDLINE DATE	APVD

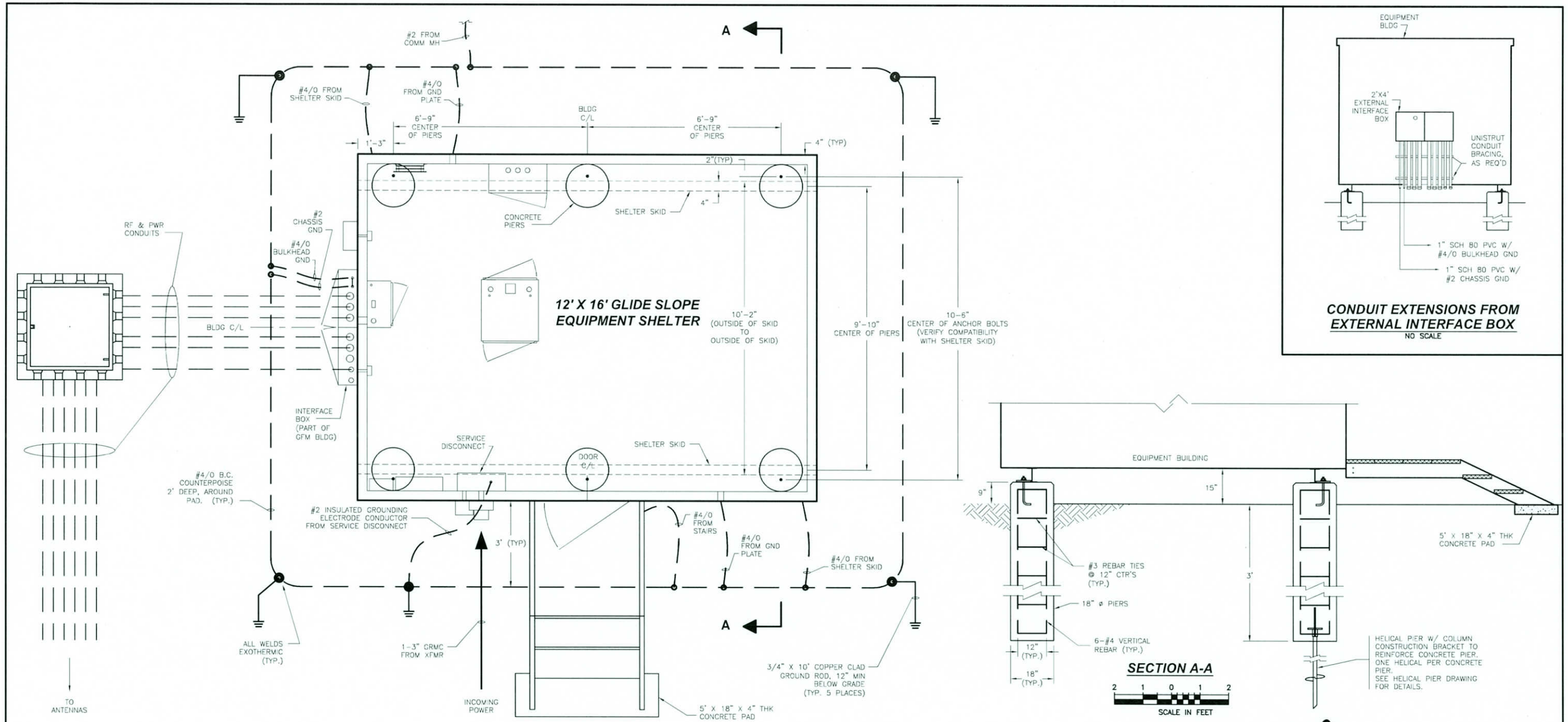
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L BUILDING INTERIOR LAYOUT

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY		SUBMITTED BY:		APPROVED BY:	
		PROJECT ENGINEER: KELINA WONG	ISSUED BY	MGR: NAVAIDS ENGINEERING	
		DESIGNED: B.BROWN		DATE:	JCN:
		DRAWN: B.BROWN	ENGINEERING SERVICES NAVAIDS	DRAWING NO.: APC-B-GS36L-G008	REV: X
		CHECKED:			

5.5.11



FOUNDATION PLAN AND GROUNDING LAYOUT

2 1 0 1 2
SCALE IN FEET

SECTION A-A

2 1 0 1 2
SCALE IN FEET

CONDUIT EXTENSIONS FROM EXTERNAL INTERFACE BOX
NO SCALE

NOTES:

1. USE TYPE III (HIGH-EARLY STRENGTH) CEMENT TO OBTAIN A SEVEN DAY COMPRESSIVE STRENGTH OF 3000 PSI.
2. IF FILL IS REQUIRED, IT SHALL BE PLACED IN LAYERS NOT EXCEEDING 8". EACH LAYER SHALL BE COMPACTED TO 90% OF THE MAXIMUM DENSITY DETERMINED BY AASHTO T-99. GRADING OF SOIL AND ROCK SHALL PROVIDE DRAINAGE AWAY FROM THE BUILDING.
3. PIER FOUNDATIONS MUST BE HORIZONTALLY LEVEL WITH EACH OTHER WITHIN 1/4". INDIVIDUAL SURFACES MUST BE LEVEL WITHIN 1/8".
4. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE SHELTER SKIDS TO INSURE COMPATIBILITY WITH PIER AND ANCHOR BOLT LAYOUT.
5. THE BUILDING SHALL BE ANCHORED TO THE PIERS AS APPROVED.

NOTES:

A. THE GOVERNMENT FURNISHED BUILDING COMES WITH A SERVICE DISCONNECT, DISTRIBUTION PANEL, SURGE ARRESTORS, AND MAIN GROUND PLATES.

B. CONTRACTOR SHALL PROVIDE POWER TO THE BUILDING (SEE NOTE BELOW) AND INSTALL FACILITY GROUNDING (INCLUDES LANDING THE #4/0 ON THE MAIN GROUND PLATES).

C. CONTRACTOR SHALL WORK WITH THE POWER COMPANY TO PROVIDE POWER SERVICE TO THE BLDG (INCLUDES METER INSTALLATION PER THE PWR CO REQUIREMENTS).

construction

REV	REVISED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

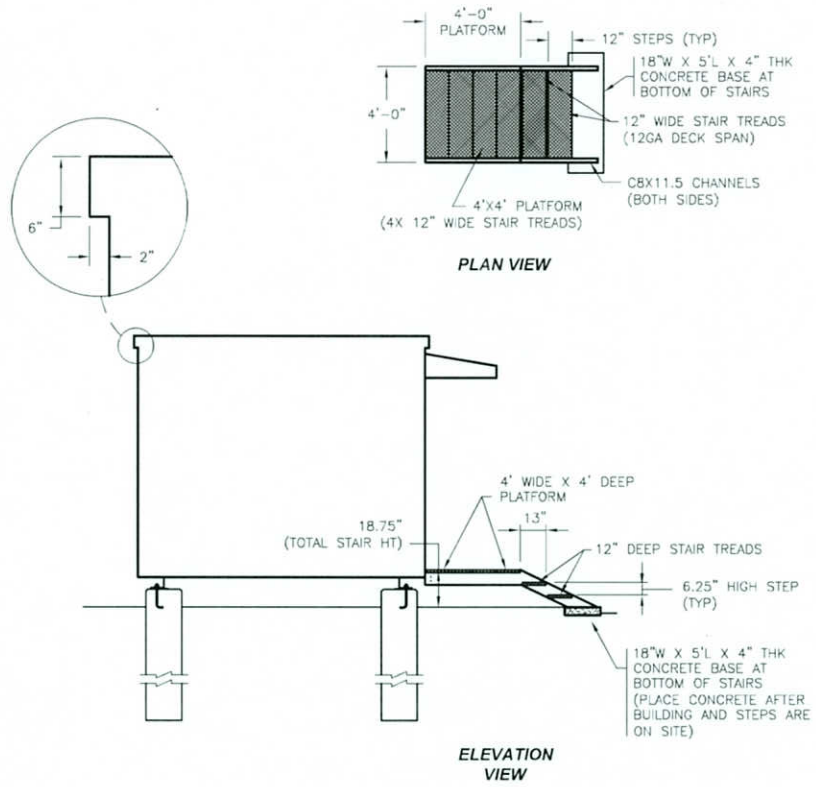
END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L BUILDING FOUNDATION

NAPA — NAPA COUNTY AIRPORT — CA

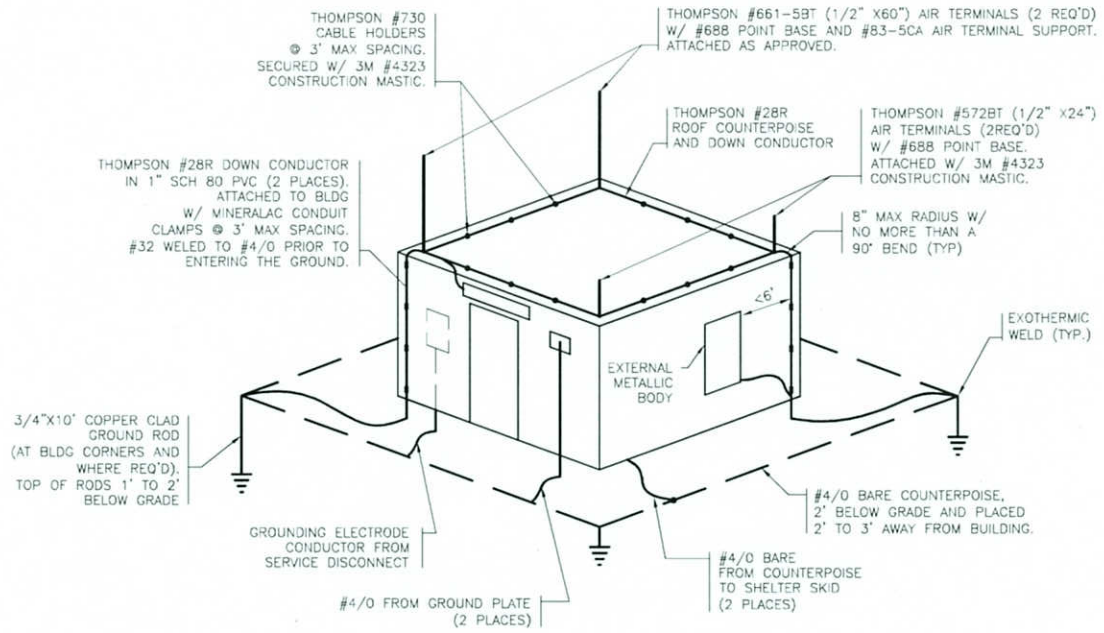
REVIEWED BY	SUBMITTED BY:	APPROVED BY:
	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING
	DESIGNED: B.BROWN	DATE: JCN:
	DRAWN: B.BROWN	DRAWING NO.: REV
	CHECKED:	APC-B-GS36L-G009 . X

ISSUED BY ENGINEERING SERVICES NAVAIDS

5.5.11



STEEL GRATE DOOR STEP DETAILS
(STEPS FURNISHED WITH BLDG)
NOT TO SCALE

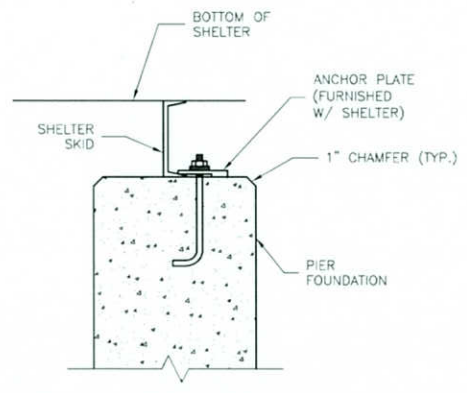


TYPICAL EQUIPMENT BUILDING EXTERIOR LIGHTNING PROTECTION PLAN
NOT TO SCALE

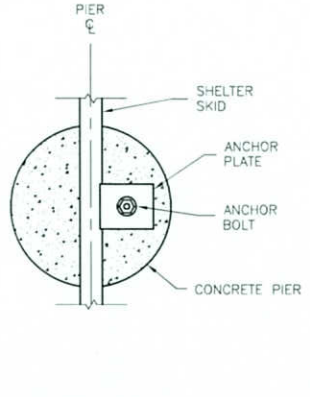
NOTE:

GROUNDING CONDUCTORS FROM THE BUILDING TO THE COUNTERPOISE OUTSIDE OF THE BUILDING INCLUDE:

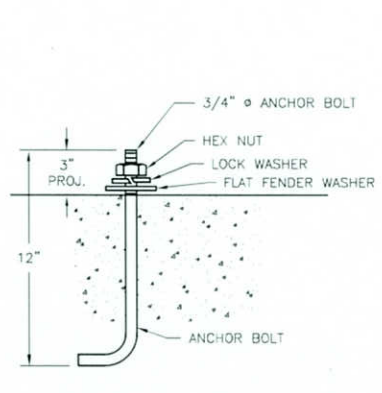
- GROUNDING ELECTRODE CONDUCTOR FROM THE MAIN SERVICE DISCONNECT (ROUTED IN 1" SCH 80 PVC).
- GROUNDING CONDUCTORS FROM GROUND PLATE (ROUTED IN 2.5" SCH 80 PVC).
- GROUNDING CONDUCTORS FROM THE SHELTER SKIDS (2 PLACES).
- GROUNDING CONDUCTORS FROM THE BUILDING AIR TERMINALS (2 PLACES).
- GROUNDING CONDUCTOR FROM EXTERNAL INTERFACE BOX (CHASSIS & BULKHEAD GNDS) – NOT SHOWN ABOVE.
- BONDING CONDUCTORS FROM EXTERNAL METALLIC BODIES LOCATED WITHIN 6 FEET HORIZONTALLY OF ANY DOWN CONDUCTOR (SUCH AS HVAC UNITS AND DOOR HOOD). TERMINATE THESE TYPES OF CONDUCTORS ON THE DOWN CONDUCTOR FROM THE AIR TERMINAL USING APPROVED PARALLEL CONNECTORS.



SHELTER ANCHOR DETAIL
(TYP OF SIX)
NOT TO SCALE



PIER TOP VIEW
(TYP OF SIX)
NOT TO SCALE



SHELTER ANCHOR BOLT DETAIL
(TYP OF SIX)
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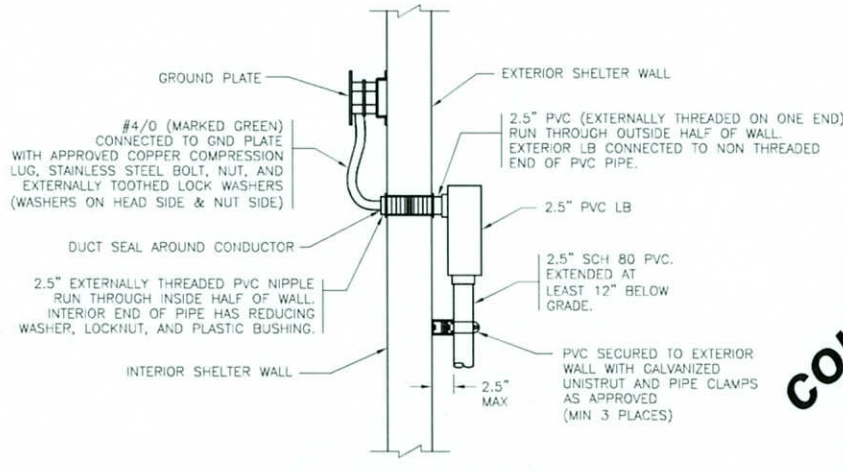

ROUTING DETAIL FOR #4/0 FROM GND PLATE
NOT TO SCALE

construction

REV	REVISED DATE	DESCRIPTION	JCN	REQ'D/NE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO – TECHNICAL OPERATIONS — WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L BUILDING FOUNDATION MISC DETAILS

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY	SUBMITTED BY:	APPROVED BY:
	PROJECT ENGINEER: BOB BROWN	MGR: NAVAIDS ENGINEERING
	DESIGNED: B.BROWN	DATE: . JCN: .
	DRAWN: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS
	CHECKED:	DRAWING NO.: APC-B-GS36L-G0010 REV . X

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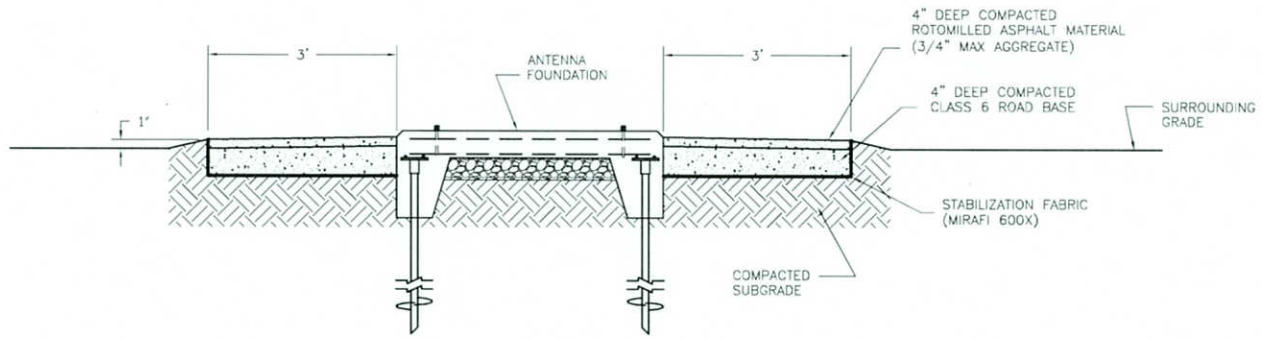
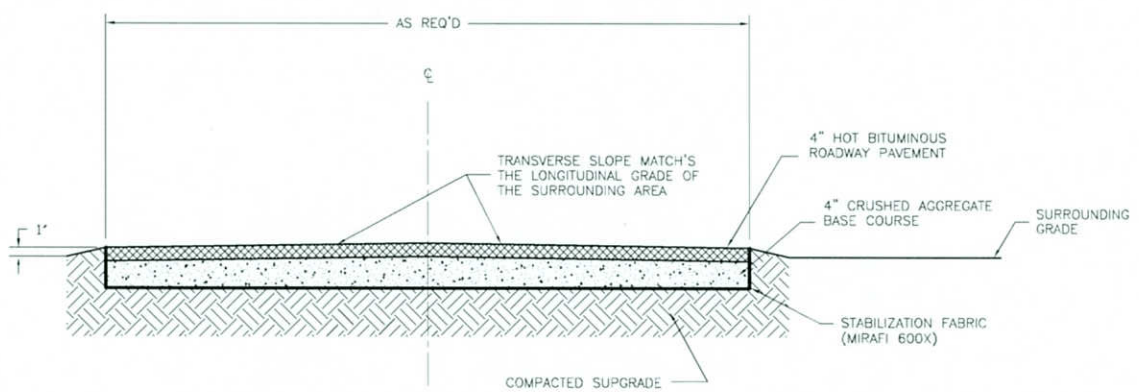


TYPICAL ROTOMILL SURFACE AROUND FOUNDATIONS

NOT TO SCALE

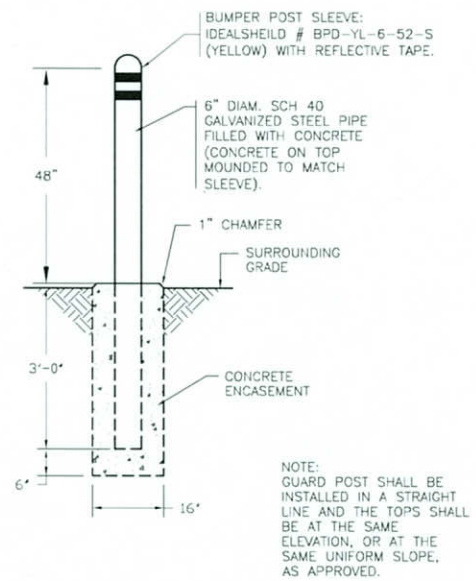


PAVED ACCESS ROAD

NOT TO SCALE

ROAD NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIAL AND/OR REMOVING AND DISPOSING OF EXISTING MATERIAL TO CONSTRUCT THE ROADS AS SHOWN.
2. ALL ROAD BASE AND ROTOMILL MATERIAL SHALL BE APPROVED BY THE FAA PROJECT ENGINEER.
3. THE MATERIAL SHALL BE CLEAN AND WELL GRADED AND BE COMPACTED TO 95% OF MAX DENSITY IN ACCORDANCE WITH AASHTO T 180.
4. ALL AGGREGATE MATERIAL SHALL BE APPROVED BY THE PROJECT ENGINEER BEFORE PLACEMENT.



GUARD POST

INSTALLED AROUND POWER CO. XFMR AND AS DIRECTED

NOT TO SCALE

construction

REV	APPROVED DATE	DESCRIPTION	JCN	RELEASE DATE	APVD

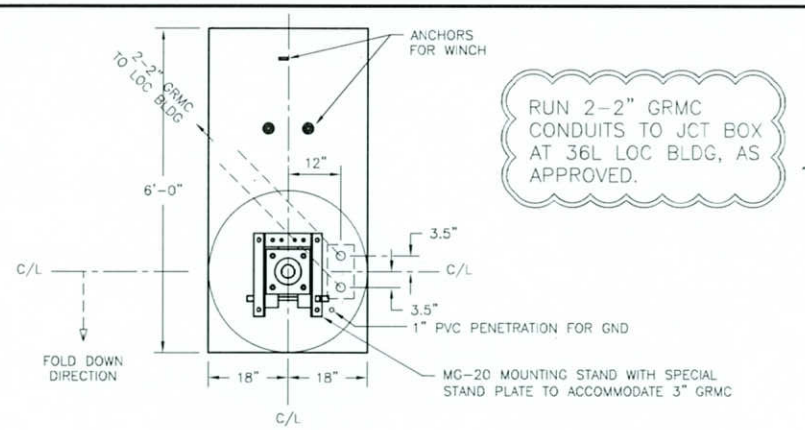
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA

END-FIRE GLIDE SLOPE ANTENNA RUNWAY 36L ROADS & GUARD POST

NAPA NAPA COUNTY AIRPORT CA

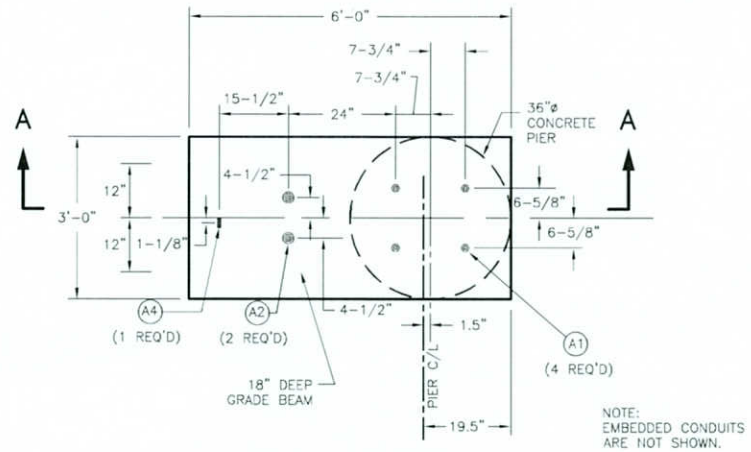
REVIEWED BY	SUBMITTED BY:	APPROVED BY:
	PROJECT ENGINEER: KELINA WONG	MGR: NAVAIDS ENGINEERING
	DESIGNED: B.BROWN	DATE: JCN:
	DRAWN: B.BROWN	ISSUED BY: ENGINEERING SERVICES NAVAIDS
	CHECKED:	DRAWING NO.: APC-B-GS36L-G011 REV. X

5.5.11



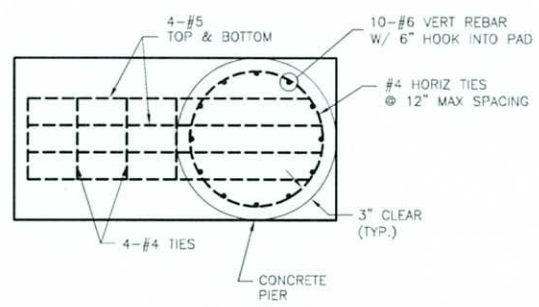
RUN 2-2" GRMC CONDUITS TO JCT BOX AT 36L LOC BLDG, AS APPROVED.

PLAN VIEW
NOT TO SCALE

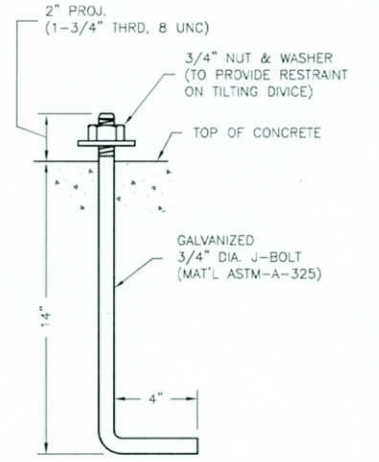


NOTE: EMBEDDED CONDUITS ARE NOT SHOWN.

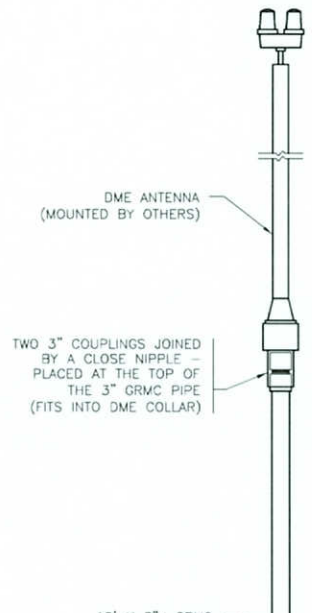
FOUNDATION LAYOUT FOR MG-20
PLAN VIEW
NOT TO SCALE

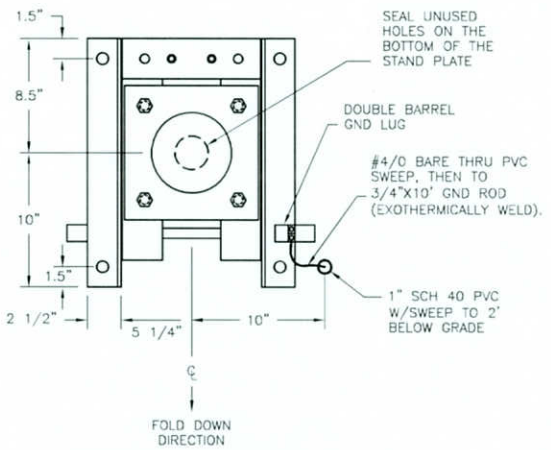


SECTION B-B
NOT TO SCALE

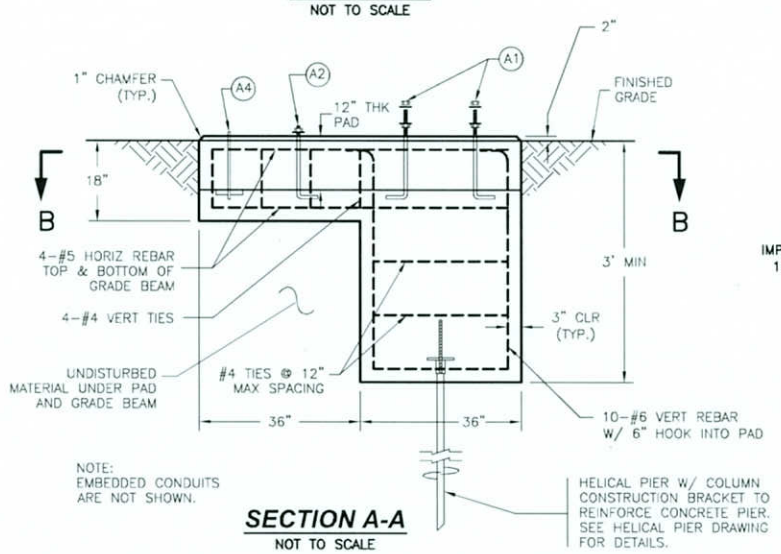


MG-20 WINCH BOLTS - A2 (3/4"X16")
NOT TO SCALE

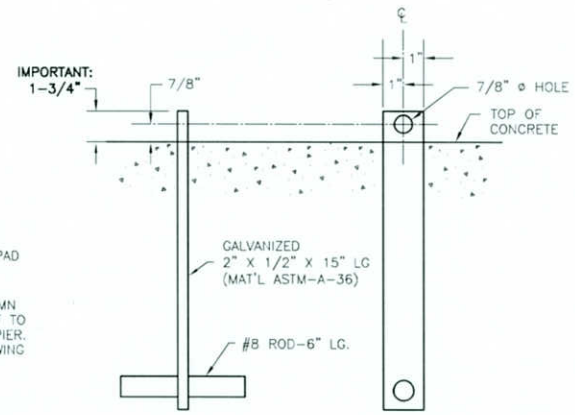




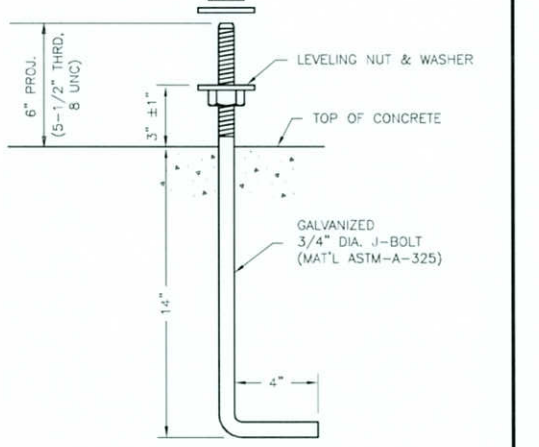
DETAIL FOR MG-20
MOUNTING STAND ASSY
NOT TO SCALE



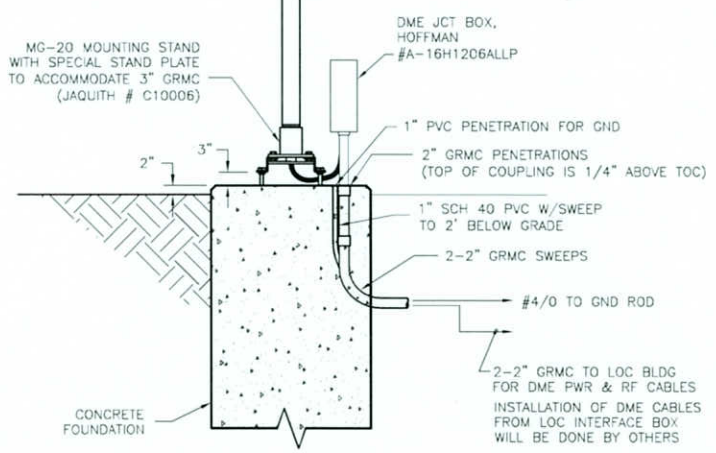
SECTION A-A
NOT TO SCALE



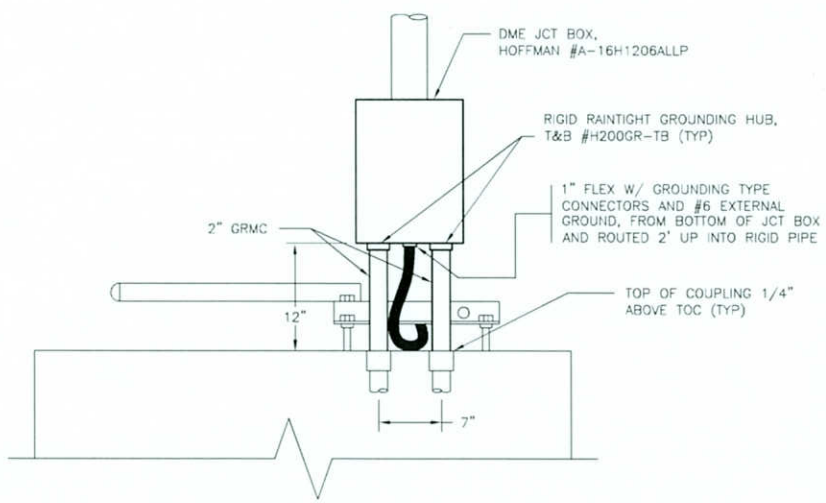
ANCHOR PLATE - A4
NOT TO SCALE



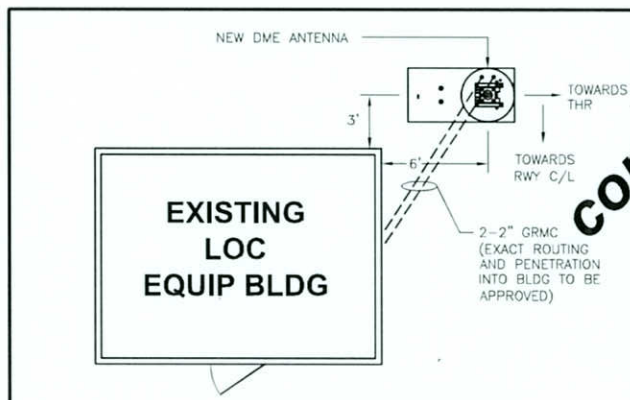
ANCHOR BOLT - A1 (3/4"X20")
NOT TO SCALE



ELEVATION VIEW
NOT TO SCALE



DME JCT BOX - DETAIL
SCALE X 2



GENERAL PLAN VIEW
NOT TO SCALE

construction

REVIEWED	APPROVED	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS — WESTERN SERVICE AREA

DME RUNWAY 36L FOUNDATION DETAIL

NAPA — NAPA COUNTY AIRPORT — CA

REVIEWED BY	SUBMITTED BY:	APPROVED BY:
PROJECT ENGINEER: KELINA WONG		MGR: NAVAIDS ENGINEERING
DESIGNED: B.BROWN	ISSUED BY ENGINEERING SERVICES NAVAIDS	DATE: . JCN: .
DRAWN: B.BROWN		DRAWING NO.: APC-B-DME-G012 REV .
CHECKED:		

X

5.5.11